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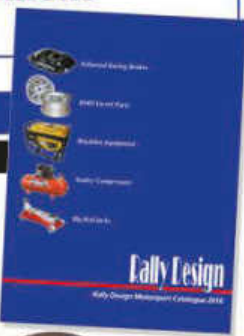
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Welcome



Kit car journalist for over 15 years. Built a Sylva Riot and raced a Tiger Avon for several seasons. Has run numerous kit cars as daily drivers over the years.

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Have you noticed that whenever officialdom makes changes to the workings of established systems, there's some way in which things get worse for the end user. An example?

Since the deletion of tax discs, we've all just swallowed the fact that when you sell a car you can only claim back complete months as a refund. The buyer, meanwhile, can only purchase full months, so the treasury gets double revenue for the month you're in at the time. That might seem like a cute money-making scheme for the government, until you realise that vehicle excise duty evasion doubled in the first year tax discs were abandoned, equating to a loss of about £80m.

The computerisation of MoT records is also potentially troublesome for the motorist, in a way that many haven't foreseen. A friend of mine recently had a *caveat emptor* moment when he checked out the MoT status of a car he'd purchased just under 12 months earlier. When he bought it, the car came with a year's MoT so he knew it must almost be due. When he logged onto the online system, he found that it had actually expired several months earlier. This was at odds with the MoT result sheet that came with the car.

The reason? In order to forge a new style MoT result sheet (which, importantly, is *not* a certificate), all you need to do is overlay the expiry date you want and photocopy it. And as a little bonus to the forgers, a blank piece of paper can also eradicate advisory notes. And if you're a trusting sort of person, as my friend who bought

the car is, you're liable to be fined if the police notice that you're driving without a valid MoT. If you can explain what was wrong with the old certificates, embossed with the MoT station's details, I'd be interested to know. Oh, and while I'm on a rant about modern technology, don't even get me started on the shambolic chaos that is Dart Charge, which has been introduced to replace the toll booths at the Dartford crossing.

Anyway, you didn't come here to read me complaining for an entire page so let's move on to cheerier topics – assuming, that is, that anyone has humoured me to the extent of reading this far.

I want to draw your attention to the news of the numerous events we're involved with during 2016. As well as fixtures we're all used to – such as the London to Brighton Kit and Sports Car Run, the CKC/Omex track day and the Classic, Kit & Retro Action Day – we'll also be involved in organising dedicated areas for kit car owners at no fewer than four established classic car shows. The first one is on Easter Monday (late March this year) at Weston Park, Shropshire. If you want to be there – and we hope you do! – you need to book via CKC. All the details can be found in the item on page 12. And if you miss that one, make sure you don't miss the main kit car event of the year at Stoneleigh on the usual early May bank holiday weekend.

Adam Wilkins, Editor

[@AdamWilkins_](#)



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Pick up the April 2016 issue Friday 4 March

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Avatar Roadster revealed (but you can't build it yourself)

Prior to its debut at the Autosport International show, the teaser image above right was all we had to go on for the new Avatar Roadster. It's the road/track day version of the Avatar One race car that's been proving its mettle in the Castle Combe Sports and GT Championship, and it promises to be a formidable performer. Sadly, you won't be able to build one yourself – it will only be available in turnkey form, but the marque's close association with sister company Marlin Sports Cars meant that we couldn't ignore it.

Probably the biggest news regarding the car's technical specification is its true mid-engined layout. Thanks to the use of a Porsche Boxster gearbox, the 2.0-litre Ford Ecoboost engine is mounted longitudinally in the chassis. It's potent, too: the turbocharged four produces 252bhp, enough for a 150mph top speed and a 0-60mph time of 3.9sec. Not enough? The 2.3-litre 350bhp engine from the forthcoming Focus RS and Mustang will be an option.

Further enhancing the weight distribution is the inset driver's seat, which brings it closer to the centre line of the car than the passenger. "This arrangement not only offers better weight

distribution and, we think, purer driving experience but also provides storage space alongside the driver for the optional 'get me home' roof," says Dylan Popovic, Avatar designer and company racing driver.

A pre-delivery 'tailored' session means each car leaves the factory corner-weighted and set-up

specific to the buyer's weight, driving preferences and planned use. "We want to know each of our customers and their cars personally," says Terry Matthews, Avatar founder.

The retail price is comfortably under £30,000, and various track-focused options appear on the pricelist. A full roll cage,

six-point harnesses, extinguisher, uprated cooling pack, DL1 data logger and camera, HANS custom seat and race-only aero package are all offered. A one-year unlimited mileage warranty is standard.

Even before the car was shown, Avatar had taken four orders for the Roadster.

www.avatarsportscars.co.uk



Exo Sports Cars reveals Rocket 2 at Autosport International

New from Exo Sports Cars is the Rocket 2,

a clean-sheet design that was shown in chassis form at the



Autosport show. The car will be available only as a complete kit in a box (right down to all the nuts and bolts needed to complete the build), with a price tag of around £15,000, which will include a 2.0-litre Ford Zetec engine running with Omex engine management. The Ecoboost will be an extra-cost option, as is the distinctive finish shown on the first chassis.

The Rocket 2 has a GRP nosecone to bring it into line with other models in the Exo Sports Cars range, while the dramatic upsweep of the side rail is another distinctive feature that will mark the new model.



While the car was shown at a very early stage of assembly at Autosport International, Exo Sports Cars aims to have the first demonstrator up and running comfortably before May's Stoneleigh show, and possibly as early as next month.

www.exosportscars.co.uk



Hawk teases Daytona install

Here's the latest teaser from Hawk Cars on the development of its Daytona replica. The aluminium bodied car will be sold in very limited numbers to discerning fans of the original cars. We can't wait to see the demonstrator finished!

W: www.hawkcars.co.uk



Paint by Tiger

A recent addition to Tiger Racing's factory is a spray booth. You don't need to own a Tiger – or even a kit car – to take advantage of the new service it offers. Call the company for a quote.

W: www.tigerracing.com



Westfield adopts Ecoboost for new Sport 250

Westfield Sportscars has just launched the Sport 250, a new model that uses the 2.0-litre Ford Ecoboost engine usually found in the Focus ST. It uses low inertia turbocharging to keep its emissions down and its performance up. If you've already read the piece about the Avatar Roadster on the opposite page, you'll know that the Ecoboost produces 252bhp.

The Sport 250 takes the place of the Mega S2000 in the range, although the latter remains available for home builders if the idea of big capacity VTEC power is too much to resist!

Back to the Sport 250. The price for an utterly comprehensive kit containing everything needed to put the car together is £24,999, while fully built cars are available from £28,745.



Meanwhile, the company had its innovative rotary engine on display, attached to a Mazda MX-5 gearbox. A rotary



demonstrator is due to be running within a matter of weeks.

www.westfield-sportscars.co.uk



CPOP date correction

Our thanks to reader Roger Brown for alerting us to the fact we had the Cholmondeley Pageant of Power wrongly listed in our events page – we had it under July instead of June. The correct dates are 10-12 June.

W: www.cpop.co.uk



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Ecoboost future

If there was one recurring theme at the recent Autosport International show, it was the prevalence of Ford's Ecoboost engine in new models, whether kit or production car. It didn't matter where you looked, everyone was sporting a model with one or other variant of Ford's seemingly all-conquering latest powerplant. And it's pretty easy to see why...

By all accounts, it's an engine that offers plenty of power, straight out of the box. More importantly perhaps, it seems it also responds well to being tuned. And vitally, Ford is actively encouraging other manufacturers to use the engine. For the likes of Westfield, Avatar and others that's great news when offering brand new cars, whether turnkey or in kit form. Where Westfield has been promoting its fantastic Honda VTEC engine model for the last few years, it's only ever been with second-hand engines... and that's no use at all when it comes to selling complete kits in a box. With the Ecoboost unit, it's problem solved... with the added benefit of similar power and lots more torque... let's only hope the Ecoboost has character too!

Ford's backing of aftermarket installations is key, and makes you wonder whether we'll see other existing kit manufacturers head down this route, as well as new companies entering the scene for the first time – I suspect we will. That's great news for the kit car industry. If new manufacturers can see potential with Ford's backing, then my guess is we are going to see some very exciting new cars coming to market in the months and years to come.

Ian Stent

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Aries takes on the Sabre

Aries Motorsport was taken over by Phil Edwards in 2015, and the company has already added to its portfolio with the Sabre, formerly made by AB Performance.

Negotiations had been under way since last September, but the company told nobody about the deal until the news was officially made public at the Autosport

International show. If you missed the news, you won't have missed the bright pink and black demonstrator!

Aries Motorsport has ambitious plans for 2016, with a very packed calendar of events that it plans to attend with both the Sabre and its Lotus Seven inspired model. Watch this space...

www.facebook.com/ariesmsport



From the ads: Hunstman



A slightly odd 'From the ads' this month. Usually we tell you how much the car is and where it's advertised, but this time we can't. But we do know that it's for sale... somewhere.

The Huntsman was built as a one-off in 1988, its squared prototype racer inspired styling looking pretty sharp at the time and its 1.5-litre Alfa Romeo engine giving it great character. In 1997, Tiger Racing bought it and it looked like it might go into production, but it was soon sold again and disappeared from the radar.

According to the All Car Index blog, it was advertised for sale in January, but there are no clues where and Google doesn't know either. The photo above shows it looking a little sorry for itself, and we can't help wonder whether its glory will be restored. And we certainly can't point you in the right direction if you want to restore it. If you know more, tell us!

Dax hardtop project for sale

You may remember Indy car engineer Rich Howlett showing his aftermarket hardtop for the Dax Rush at Stoneleigh a few years ago. He is now offering the manufacturing rights and tooling for sale.

The opportunity brings 20 years exclusive intellectual property rights with all plugs, moulds and new sales opportunities.

No figure for the sale is



mentioned, and interested parties should contact Rich on rich@richhowlett.co.uk www.richhowlett.co.uk



Finance on GBS range

Great British Sports Cars is now able to offer finance packages for its Zero model. The deals are available for both kits and turnkey cars, as well as other associated products.

GBS is happy to discuss finance options with you in more detail specific to your circumstances.

Fresh from its appearance at Autosport International, the company will be at Race Retro later this month – and you can win tickets to the show by liking and sharing the company's Facebook page.

www.greatbritishsportscars.co.uk





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Caterham tames the 620



Caterham has introduced a slightly saner version of the 620R – the new 620S is more biased towards road use, offering the option of the wider SV chassis (which now seems to be known as the S5) and other ‘luxuries’ such as a windscreen and even heated seats.

A few statistics: the car produces 310bhp (the same as the R) and cracks the 0-60mph sprint in 3.4sec and goes on to 145mph. Does the extra comfort takes its toll on performance? Slightly. The R’s performance figures are 0-60mph in 2.8sec and a top speed of 155mph.

In line with the existing 620R, the new 620S is not available in kit form, which means you’ll have to hand over £44,995 (a £5k saving compared to the R) and take delivery of the car ready to drive away.

www.caterham.com

Official: Healy Enigma gets Lexus V8

Just as this issue closed for press, we received word from Healy Designs that it had taken delivery of its Lexus V8 powered demonstrator from the Latvian factory. With twice the capacity of the biggest Mazda MX-5 engines seen in Healys to date, the 4.0-litre V8 from the LS400 (1994 to 1999) offers Healy customers something completely new.

The chassis has been revamped with extra strengthening around the differential carrier and a revised centre tunnel to accommodate the new engine. As standard, the car comes with the donor Lexus’s four-speed automatic gearbox, but

a manual option will follow.

Like the four-cylinder car, the V8 has the option of folding hard or soft-tops, and the visual clue to the new car is the power bulge on the bonnet necessary to allow space for the 4.0-litre engine. The kit costs £4995, to which you need to add an MX-5 and a Lexus donor, paint, lights, instruments

and few other parts.

The company has recently bought a sub 100,000-mile Lexus donor for £850, the mechanicals of which are now on their way to Latvia to be fitted to the next car. It’s estimated that a self-built Enigma V8 could be on the road for about £13,000.

www.healydesigns.co.uk



Xmoor Riot road legal

Xmoor Cars is a company we haven’t heard much from lately, but the company has been making progress on its revised Riot Classic, which it took over from Sylva Autokits a few years ago.

The latest news is that the prototype/demonstrator passed the IVA test towards the end of last year, the photo here showing it undergoing the test. But there’s still more development in the pipelines, including a modified rear clam with additional vents,

frenched in fog and reverse lights and experimentation with different gearboxes, notably a 5-speed in place of the current 6-speed.

www.riotcars.co.uk



Ferrari P4 project for sale

Cairngall Motor Services, based in Aberdeenshire, is offering for sale the tooling and rights to a Ferrari P4 replica, described as “originated by Lee Noble.” While Lee Noble did release the first P4 replica in the early 1990s, other companies also sprang to the market offering similar replicas.

The deal is being offered at £49,500 and includes the chassis jigs as well as the body moulds for both the coupé and

open top models. Suspension jigs, production rights and documentation is also included in the sale. There’s also a large inventory of chassis and suspension parts, and vendor contacts.

The P4 was always considered one of the best looking racing cars of the 1960s, and the current classic car boom could make this an ideal time to relaunch a replica.

E: cairngallmotorservices@btconnect.com



100 issues ago

We took two V8 Daxes through the capital city’s tunnels at midnight because... why not? We also carried early news of the Rayvolution Evo three-wheeler, and our readers’ cars features were as disparate as a Moto Guzzi powered Blackjack Avion and a Ford Sierra based ‘Eleanor’ Mustang replica. We also staged a Reader’s Car of the Year contest.



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Join CKC at a show near you in 2016

Whether you are a member of a club or not, here's news of seven shows CKC is involved with which we'd love you to get into your 2016 diary. We've been working hard to build a variety of different events that kit car owners can feel part of, which now include...

***March 28 – Motorfest.** Weston Park, Shropshire.

May 14 – CKC/Omex Trackday. Llandow.

***May 30 – Motor Show.** Ragley Hall, Warwickshire.

June 5 – London To Brighton Kit and Sports Car Run.

***June 25 – Classic, Kit & Retro Action Day.** Castle Combe, Wiltshire.

***August 29 – Knebworth Classic Motor Show.** Knebworth, Hertfordshire.

***November 5/6 – Classic Restoration Show.** Shepton Mallet, Somerset.

For those marked with a * you'll need to book via CKC, whether as an individual or on behalf of your club. Advance booking is required for these events if you want



discounted/free entry, and we will then arrange for the necessary tickets/passes to be sent out to you. Please use the contact details at the end of this piece.

For the other events, please deal directly with the event organisers, contact details for which can be found in our Events

listing on page 15.

The aim with all of these new events is to create a kit car community at each show, where you and your club can feel part of a special display.

All these new events are obviously in addition to the main industry show of the year,

Stoneleigh, which CKC is once again proud to sponsor. This is the biggest kit car specific event on the planet.

But we obviously hope you'll want to join us at these other new exciting venues, where we can champion this great scene of ours. There will be lots to see at each

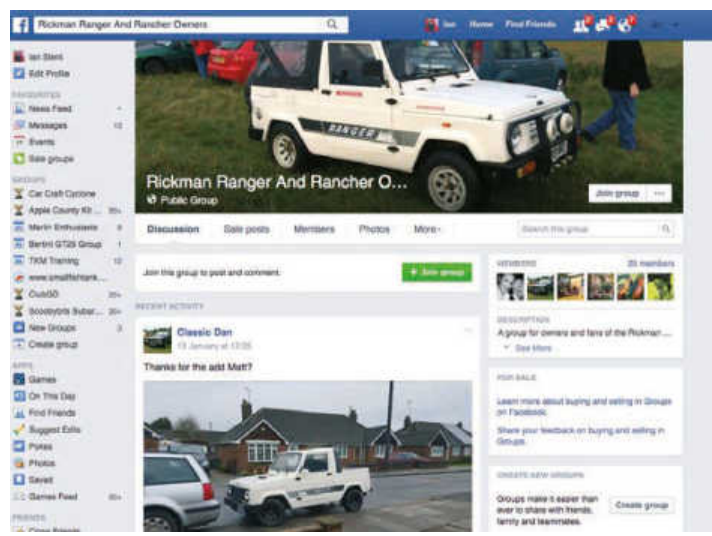
Rickman OC joins Facebook

Lots of clubs quite rightly have a Facebook page, and the Rickman Owners' Club has decided it's time it too joined in.

Of course, Facebook in itself isn't the complete solution for club members to keep in contact. A club forum is also good news, as is a trusty website. In reality, they must all work together, with

some people preferring one method of contact over another. For the Rickman OC is seems the new development is proving popular and it's fascinating what you find... for instance, member Mark Jacobs has a Ranger for sale, in New Zealand!

W: www.rickmancarsownersclub.org.uk
Facebook: <http://tinyurl.com/zfergl6>



Club talks...

Kit car clubs don't survive without input from individuals and interesting things being arranged to keep the membership engaged.

So it's interesting to read that the Kent Kit Car Club has arranged for a talk by Tony Barber, a member of the Bloodhound team who are hoping to set a new land

speed record in 2017. That's surely going to be a really well supported event and a brilliant way of enthusing members.

If your club has a committee, perhaps one of the team should take responsibility for organising a few events throughout 2016? Not all the talks have to be on such high profile subjects, but we reckon you'll be amazed how much your club appreciates these gatherings, however humble.

W: www.kentkitcarclub.com





show, often with a diverse spread of classic car displays making these more than a conventional kit car only show. CKC will obviously be at each one and we look forward to welcoming you into the kit car area. Thanks for your support.

E: adam@performancepublishing.co.uk

Try a track day

If a static show isn't really your thing, and you'd prefer to test yourself and your car to the limit, then make 2016 the year you take your car on track.

The CKC/Omex Trackday takes place on Saturday 14 May at Llandow circuit in Wales, just off the M4. It's a kit car only day, so you'll be on track with like-minded owners and the paddock is a friendly place to have a chat and talk technique!

The day costs just £95 for a car and driver, and if you are a CKC subscriber and therefore a Club CKC member, you can book in for just £75 (you must be a subscriber at the time of booking



and on the day of the track day.

Now a well established event in the calendar, places are booked fast and we are already well subscribed. However, there are still some places available and you can book instantly via the CKC website, or by calling the number below. We look forward to seeing you there.

T: 01476 978843.

W: www.completekitcar.co.uk



You *can* have your cake and eat it!

JZR owners Lauren and Henry Tierney produced this amazing JZR shaped cake for last year's Welsh Wander, an annual pilgrimage into the Welsh countryside for hardy JZR owners. Four owners took their cars, while others joined in a weekend of activities with their tin

top (cowards!). The weekend was hosted by locals Kath and Frances, with a number of pre-arranged tours on both days, including the inevitable pub lunches etc. But the highlight has to be the cake! Great effort.

www.jzrpa.com



Pic: Kath Shaw

Other news...

Tool dog – This is surely what every kit car builder could do with. Just copy the link here (or tap the play button in the CKC app) to see one of the funniest additions to every kit car builder's tool collection.

W: <http://tinyurl.com/zmlkrbe>



Air suspension – One feature that seemed to be everywhere at the recent Autosport international show was airbag suspension, allowing cars to be dropped, quite literally, to the ground. Watch this space to see which kit car manufacturer is first to follow suit... on the right car we think it looks fab.



Bertini door tray

There's no stopping the ingenuity of some people! Roger and Yoland Brown, owners of the ex-CKC Bertini GT25, sent in this picture of the natty snack tray they'd created which balances perfectly on the door top of the Bertini.

Roger commented, "Bertinis (and many other kit cars) are all curves and nowhere to put your coffee/cake when you take a break. Hence, we made an American drive-in diner style door tray." And don't panic about damaging the paint (as we initially did!) because rubber ends to the aluminium legs mean the shiny paint is perfectly protected while the rubber ensures a slip-free cuppa!



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2016 Events

There's plenty to entertain you and your kit car. Here's our diary of the events in 2016 that have caught our eye. If you know more, tell us and we'll get the word out.



MARCH

19th/20th

Goodwood 74th Members Meeting

Goodwood Race Circuit,
West Sussex
Satnav: PO18 0PX
T: 01243 755055
W: www.goodwood.co.uk
Previously members-only event now open, to a limited extent, to the public.

Easter Monday 28th

Motorfest

Weston Park, Nr Shifnal, Shropshire
Satnav: TF11 8LE
T: 01527 831726
W: www.classicmotorshows.co.uk
Join CKC as we establish a dedicated area set aside for kit car clubs and owners.

MAY

1st/2nd

The National Kit Car Motor Show

Stoneleigh Park,
Warwickshire
Grosvenor Shows
Satnav: CV8 2LZ
T: 01406 372600
W: www.grosvenorshows.co.uk
The world's biggest kit car show. Lots of clubs, manufacturers and parts stands. Do not miss this.

Saturday 14th

CKC/Omex Track Day

Llandow Circuit.
Satnav: CF71 7PB
E: adam@performancepublishing.co.uk
W: www.completekitcar.co.uk
Join us at Llandow Circuit for a brilliant track day, exclusively for

kit cars. Beginners welcome at this very friendly day. Contact us to book.

Monday 30th

Motor Show

Ragley Hall,
Alcester,
Warwickshire
Satnav: B45 5NL
T: 01527 831726
W: www.classicmotorshows.co.uk
Join CKC as we establish a dedicated area set aside for kit car clubs and private owners.

JUNE

Sunday 5th

London to Brighton Kit and Sports Car Run

Classic Motor Events
T: 01527 831726
W: www.classicmotorevents.co.uk
Join us on this great event.

16th-20th

Le Mans Tour

Classic Car Tours
T: 01355 260422
W: www.classic-car-tours.com
From £149 per person.

10th-12th

Cholmondeley Pageant Of Power

Malpas, Cheshire
Satnav: SY14 8AH
T: 01829 772432
W: www.cpop.co.uk
An event which is gaining in popularity.

18th/19th

Le Mans 24-Hour

France
An annual pilgrimage for kit car owners.

23rd-26th

Goodwood Festival of Speed

Goodwood House,
West Sussex.
Satnav: PO18 0PX
T: 01243 755055
W: www.goodwood.co.uk/fos
An essential event for the petrolhead – lots of iconic cars to see.

25th

Classic, Kit & Retro Action Day

Castle Combe circuit, Wiltshire.
Satnav: SN14 7EY
Clubs/Trade:
E: adam@performancepublishing.co.uk
W: www.completekitcar.co.uk
Public tickets/track sessions:
W: www.castlecombecircuit.co.uk
Kit cars return to Castle Combe in 2016. Get your car on the track or take a ride in a manufacturer's demo car.

JULY

7th-11th

Le Mans Classic Tour

Classic Car Tours
T: 01355 260422
W: www.classic-car-tours.com
From £179 per person.

8th-10th

Le Mans Classic

France

Sunday 24th

Kent's Kit, Custom And American Car Show

Aylesford Priory, Kent.
Satnav: ME20 7BX
T: 01732 840787

W: www.kentskitcustomandamericancarshow.co.uk
Now in its third year, here's a growing event with an interesting mix of cars.

AUGUST

Monday 29th

Knebworth Classic Motor Show

Knebworth House, Nr Stevenage,
Hertfordshire
Satnav: SG1 2AX
T: 01527 831726
W: www.classicmotorshows.co.uk
Join CKC as we establish a dedicated area set aside for kit car clubs and private owners.

SEPTEMBER

9th-11th

Goodwood Revival

Goodwood Race Circuit,
West Sussex
Satnav: PO18 0PX
T: 01243 755055
W: www.goodwood.co.uk
If you've never been before, make 2016 the year to visit the Goodwood Revival.

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Gary Axon

"Perhaps the most famous celluloid kit car appearance of all is the Lotus Seven, used extensively in the opening sequence of *The Prisoner*, so iconic in fact that Caterham later used the cult TV show's star – Patrick McGoochan – to promote a special limited edition Super Seven"



In 1982 Gary Axon penned his first published words for *Alternative Cars* magazine, precipitating what has become a lifelong obsession with the more obscure elements within the automotive world. Today he's a leading light in helping to assemble the shortlist of invited cars at motoring events, such as the Goodwood Festival of Speed, Revival and the Concours of Elegance.

The Autobianchi Primula. The *Autob...* what? OK, it might sound like some obscure brand of squeezable cheese spread with chives, but in truth the Autobianchi Primula is one of the most significant – and most forgotten – cars of the late 20th Century. Uh?

If you'll forgive the indulgence for a few moments (as the Autobianchi has little to no relevance to the kit car world), the Primula was the first real modern foray into what has now become the norm for a mid-size front-wheel-drive hatchback with a transversely mounted motor and the gearbox mounted on the end of the engine. Developed as a front-drive toe in the water by the giant Fiat Group in the early 1960s, ahead of the launch of its own multi-million selling 128, the Primula pre-empted other pioneering FWD hatchbacks such as the Simca 1100, Renault 16 and the ultimate benchmark, the 1974 Volkswagen Golf, by some years.

I mention the Autobianchi simply because I was Googling the model recently, and one of the first things to appear was a list of Primula movie appearances – 51 mentions in all, mainly in Italian films – on the astonishing IMCDB website.

In case you've not already stumbled across it, the IMCDB (International Movie Cars DataBase; www.imcbd.org/) is an unbelievably comprehensive record of virtually any vehicle that you care to mention that has appeared on the our screens, big or small, even if the said vehicle is casually parked at the side of the road, as with most of the Primulas listed.

This got me thinking about kit cars that have been seen on celluloid, some of which are listed on the IMCDB, but many of which are currently missing.

Some obvious kit movie appearances immediately spring to mind; the Adams Probe (below) in *A Clockwork Orange*

or the Meyers Manx buggy in *The Thomas Crown Affair*, for example. Others are rather less obvious.

How about the Ferrari California in *Ferris Bueller's Day Off* which, contrary to some popular belief, is not the real thing, but a rather ill-proportioned replica made in America in the 1980s by a small firm called Modena using many MGB parts. Likewise with the Ferrari 365 Daytona in *Miami Vice*, which was a Corvette-based kit, itself spawning many imitations, including one ultimately called Miami Vice!

So what of other kit cars on our screens? Richard Oakes' 1971 Nova has been a particularly popular choice, with derivatives appearing in *Condor Man*, *Death Race 2000*, *Cannonball Run III* and *Black Shampoo*. The Mini Marcos was featured in the original 1967 *Michel Valiant* film, along with various episodes of *The Avengers*, as was its larger Marcos coupé brethren, plus the *Dracula AD 1972* film, and the Spanish *Amor a Todo Gas* movie of 1969.

The Ginetta G15 can be seen in the 1971 film *I Don't Want To Be Born*, plus the later *Radio On* from 1979. On the smaller screen in the corner of our lounges, both the Dakar and GP Superbuggy enjoyed moments of fame with Anneka Rice using both kits to dash around in the *Challenge Anneka* series, with the latter also being used to foil villains by none other than James Bond.

Perhaps the most famous celluloid kit car appearance of all though is the Lotus Seven, used extensively in the opening sequence of *The Prisoner*; so iconic in fact that Caterham later used the cult TV show's star – Patrick McGoochan – to promote a special limited edition Super Seven The Prisoner model, named in the show's honour.

As for the Autobianchi Primula, if you are watching an obscure Italian film in the wee small hours because you can't sleep, do keep an eye out for one parked at the kerbside. ■

NEXT MONTH

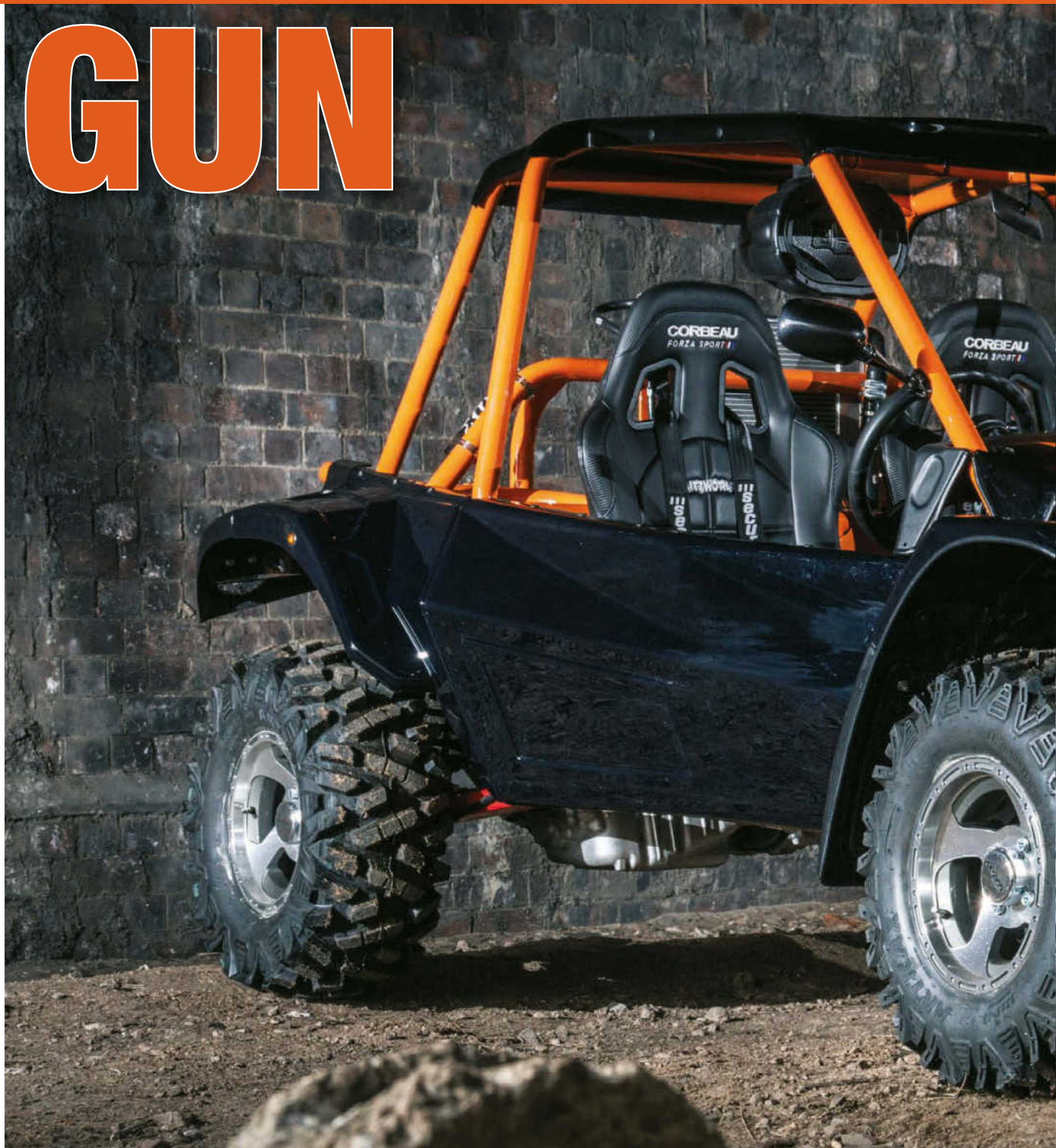


Richard Heseltine

Respected classic car journalist Richard Heseltine has been a major player at *Classic & Sports Car* and *Motor Sport* magazine before becoming a sought after freelance journalist. But he also happens to be one of the most knowledgeable kit car boffins you'll ever come across.



HIRED GUN



Blitzworld's Vigilante buggy has been constantly developed since its launch and now boasts Honda VTEC Type R power. Fully road legal and IVA approved it's as much a performance road car as it is a bonkers mudlugger.

Words and pictures: CKC

It's interesting to return to a company every few years and see a progression in its products. Blitzworld has always operated at the outer regions of the conventional kit car scene, straddling our world but also firmly with a foot in the off-road buggy/leisure scene. And as well as manufacturing its own kits, a large part of the company's business has been the import and sale of other buggies sourced from around the globe. To give you an idea, Blitzworld typically sells around 200 of these 'production' imports, either in a large box for home construction or collected from the company's unit in Stoke-on-Trent after the Blitzworld team has done the assembly work in-house.

But all the while it has been the company's in-house designed buggies that have really motivated headman, Steve Malpass. And it's here where the biggest transformation has occurred. Originally creating a Fiat based buggy back in 1997 (the KR1), Blitzworld has constantly fine-tuned the process as it has put its cars through massive real-world testing on off-road tracks around the country. From the KR1 the company launched a number of new models, including the Joyrider (Suzuki engined when we tested it) and more recent Vigilante. The





progression from one model to the next has been startling, no more so than with this latest demonstrator...

A bare rolling chassis in the small showroom sets the scene. The quality of the welding is excellent and, as we've come to expect these days, all the bracketing is laser cut for a superb finish and consistent manufacture. At each corner of this frame are the company's latest choice of coil-over damper units... high quality Fox items used throughout the off-road world, from downhill bicycles, motorbikes and, of course, buggies. On the shelves behind the chassis are examples of all the components Blitzworld has now started to design and manufacture itself... a complete pendulum pedal assembly, rear trailing suspension arms and hubs, gear change mechanism, steering column supports, bespoke aluminium radiators and fuel tanks. Almost everything for the car is now designed specifically and, if it is sourced from a production car, it's usually refurbished or sourced new and supplied by Blitzworld within the customer's chosen kit package. It's the reason all factory built Vigilantes come with a brand new registration... the only second-hand item being the engine.

From those humble Cinquecento engines used in the early cars, little demonstrates just how far the company has progressed than the unit found behind the cockpit of the current demonstrator. A 220bhp Honda VTEC Type R engine and gearbox is surely

Knobby tyres make Vigilante interesting to drive on Tarmac. Below: Interior has everything you need and nothing more.



LOOK

Interior designed to be washed out after serious off-roading. Simplicity works in its favour.



guaranteed to give the sub 500kg Vigilante more than adequate performance potential in any situation (the factory quotes a sub 3.0-second 0-60mph dash).

Blitzworld isn't just stuck on the VTEC option though because, as has always been the case, it is more than happy to make up engine mounts for any engine supplied by a customer. And while the Honda option is most usually going to be a second-hand unit, for those wanting brand new car throughout, Blitzworld has a stock of crated Ford Zetec engines... still more than enough power for the Vigilante but with the benefit of a full warranty.

Bodywork for the latest model has changed since we last saw it... and like everything else, it's for the better. The last incarnation of the car that we saw had a larger bonnet structure that also covered the front suspension towers. It looked fine, but the latest car now has a smaller bonnet with separate fixed wings and exposed suspension towers. Not only does the bright orange chassis look more interesting, but the new styling keeps the bonnet line lower and more purposeful. We like it. Unusually in the kit car scene, the bodywork is not made of fibreglass, but rather ABS plastic. It's far more hard wearing and can take some serious punishment that would soon cause GRP to crack and chip.

With the chassis in bright orange and

Tech spec

Engine as tested: 2.0-litre Honda VTEC Type R. 220bhp.

Engine options: Almost anything will fit. 2.0-litre Zetec a popular option.

Chassis: Round multi-tubular.

Bodywork: Colour impregnated plastic body panels.

Suspension: Fox coil-over struts all round, fabricated steel rear trailing arms, fabricated front hub carriers, Blitzworld sourced lower front arms.

Steering: Rack and column.

Brakes: Discs all-round.

Kit price: From £1995 plus VAT.

Contact: Blitzworld, Stoke-on-Trent, Staffordshire.

T: 01782 208050.

E: sales@blitzworld.co.uk

W: www.blitzworld.co.uk



the bodywork in black, the latest Vigilante demo car looks fantastically purposeful on its 12in Bronco alloys and knobbly Artrax off-road tyres. Steve shows us pictures of another recent factory build, this time in full Red Bull livery which looks amazing. Unsurprisingly, the buggies have great appeal within the PR and corporate entertainment markets.

To get in, you swing a leg over the high sides and then pull yourself in via the substantial roll cage structure. The

Corbeau seats are made specially for Blitzworld and the driver's side is quickly adjusted for length via the runners. The steering column is non-adjustable and on the demo car the wheel is just too far away for comfort, but Steve nips back into the showroom to dig out a steering wheel boss he has in stock which would move the wheel out by another couple of inches. Problem solved.

The simple line-of-sight gauge gives you all the information you need, while a long



Access to the engine bay components could not be easier!



gear lever is easily in reach and offers a smooth and precise cable-based gear change mechanism... it's really very good indeed.

What's also good to see here is the general level of build. The side bodywork is located along its top edge by self-tapping screws into the round-tube chassis structure and the screws themselves use black plastic spreader washers which look absolutely in keeping with the look of the car. Indeed, the quality of the plastic bodywork is excellent and the mouldings demonstrate the years of development that have gone into this and previous incarnations... they fit neatly and are extremely well located.

Sadly, there will be no proper road test of the VTEC engined demo car today. Fitted with the off-road tyres on a day with wet roads, the drive is limited to the industrial site where the factory is located. For more regular road use, Blitzworld uses Toyo tyres on different wheels... not only do they obviously provide a proper level of grip, but the steering feel is instantly transformed. The knobbly Artrax rubber on each corner of the car is certainly not designed for road

use, leaving the steering feeling very vague indeed... not what you want with 220bhp just behind your head. Take the Vigilante off-road and, of course, the Artraxes would be in their element.

But there is enough time for a whizz around the lanes on the estate. The performance is certainly as rapid as you'd expect, while the 6-speed gearbox means the buggy is going to have a frankly ludicrous top speed! But the change is as sweet as initial tests suggested... the Vigilante is an easy car to drive, but that will have to wait for another time.

Back in the showroom we can turn our attention to pricing. A basic chassis pack is £1995 and for £2995 the factory does the engine mounts and supplies the rear suspension arms (£4995 will get you a rolling chassis). From here a number of packs will take you through the build process, from items such as the bespoke wiring loom, lighting pack etc. All in, the factory reckons self-builds can be completed for around £10,000 to £15,000, with factory built examples adding around £5000 (all prices plus VAT).

Most cars are now being IVA'd and used on the road, and Blitzworld has worked hard to ensure the cars pass IVA without endless items having to be changed afterwards. And it's finding the process is getting easier and easier, with most cars passing at the first attempt.

PR and corporate use remains a popular end game for many Vigilante buggies. Following the final Donington kit car show in 2014, the company built a buggy for Mike Newman of Line of Sight. The record-breaking blind driver runs a number of events for disabled drivers to get back behind the wheel, and the buggy fits in perfectly. In fact, Blitzworld is building several more examples for the charity's use.

Although a proper road drive has eluded us on this occasion, it's been a fascinating visit. The current Vigilante is a well-made buggy with tough bodywork, good styling and massive performance potential. The measured and constant transformation from Cinquecento based fun machine into something altogether more accomplished and appealing is impressive to witness. The Vigilante is the real deal. ■

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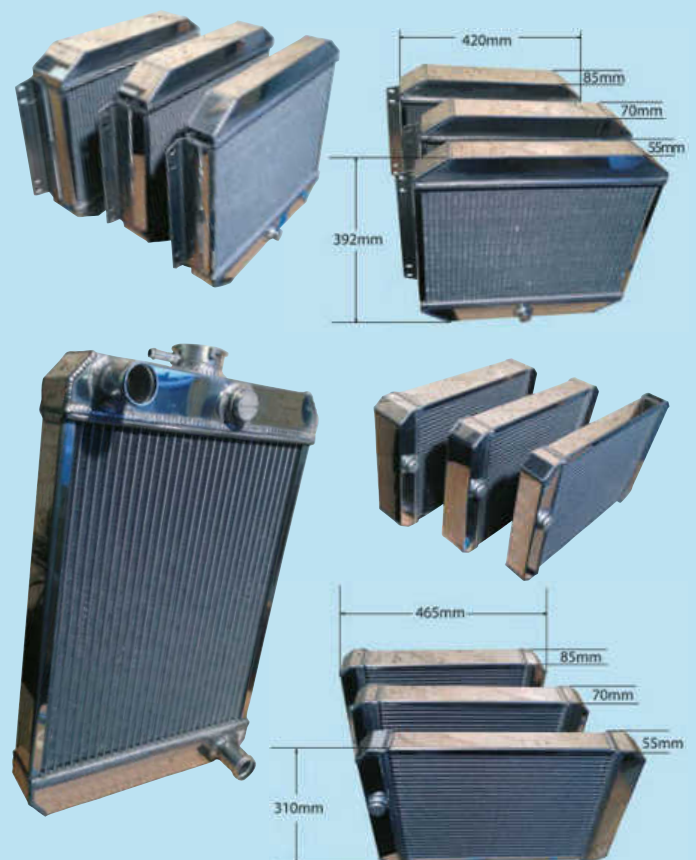
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Following feedback from the readers we have added the Polo derived & Escort derived aluminium radiators to our Transformer range. These radiators are stored blank and the hoses and outlets added to your desired positions. The Escort is the shorter version of our acclaimed Cortina / RS Escort / Mexico race quality radiators and comes in the three core sizes, fitting the GBS, Lotus, Caterham, Etc. The Polo radiator in the three sizes can have pipes on either tank, top or bottom and can also be mounted vertically for slim fronted cars. They will be displayed at the restoration show at the NEC on the 5th and 6th of March. We also specialise in vintage, veteran, classic, racing and rallying radiators.

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New kits at season opener

Words and pics: Ian Stent

This year's big season opener, Autosport International, witnessed several kit car manufacturers launching new models, with others making the most of an event jam-packed with visitors.

And CKC was there too, albeit promoting our *Trackday Directory* digital app. With a full diary of track days for the coming year (and much more besides), the free to use app is proving increasingly popular (search for it in the app store).

Elsewhere, Westfield Sportscars was revealing its new 2.0-litre Ford Ecoboost engine installation which delivers over 250bhp and over 350ft lb of torque. Exo Sports Cars had an eye-catching rolling chassis for its new Rocket 2 and Marlin Sportscars, via its Avatar brand, was launching the new road-going Avatar sports car. Unlike the Westfield or Exo products, the Avatar will only be available in turnkey form. All are revealed in more detail in this issue's news pages.

Autosport is a huge event, with

a very clear focus on performance parts that makes it extremely interesting for kit car builders. In addition, there are always a few intriguing new car manufacturers revealing cars for the first time, alongside firm favourites that it's always a pleasure to see again.

Here are just a few of the highlights that caught our eye. ■
www.autosportinternational.com



Turismo Avalanche on our stand.



Ultima on Niche Vehicle Network stand.



CKC in attendance with our Track Day Directory digital app.



Ginetta's impressive new G57 racer. Wow!



GBS had a busy stand all weekend.



Lovely Ginetta G12 for sale in the Coys auction.



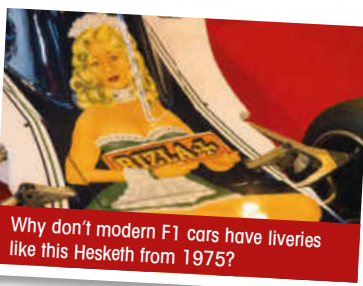
Amazing Slovakian Praga R1R is road legal!



Even with a huge specification, most thought the \$157,500 asking price for this Ford Anglia shaped racer a little steep!



Polish Hussarya GT was an impressive new supercar.



Why don't modern F1 cars have liveries like this Hesketh from 1975?



MEV with both Replicar and Exocet.



Walker-Adams Ecoboost-powered buggy.



Westfield's new Ecoboast powered car is in final stages of development.



Exo Sports Cars' new Rocket 2 created lots of interest.



Avatar launched as a road-going turnkey model.



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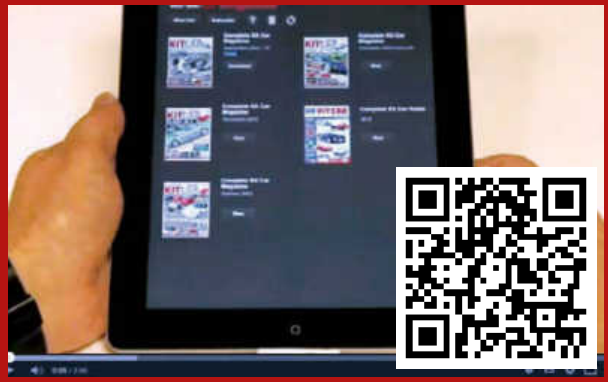
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Rover REVIVAL



Could there be a car further from a raw, aggressive Seven-inspired Tiger than a special based on a 1930s Rover? Only one way to find out...

Words and pictures: Adam Wilkins

Rover 10 special' is not a conglomeration of words I ever expected to write in *Complete Kit Car*, but I'm pretty convinced that the boat-tailed sports car you see here has a rightful place in this magazine. Here's why. The whole notion of building a car at home started just after World War Two, where wannabe racing drivers would take a dependable saloon – typically one built before the war and usually an Austin Seven – remove the steel four-seater body and drop in its place a much sportier shape made from aluminium.

From that, cars with purpose-made chassis, such as the Lotus Seven, evolved. Fast-forward a few decades and we've ended up where we are now. Where we are now is somewhere similar, where the fad for bodykits once





There's not a lot to the original four-cylinder engine from the Rover.



Original plates for tappet clearance and lubricant selection retained. Beats an owner's handbook!



Jim Dudley built the special as much for his own enjoyment as to sell on.



again sees self-builders remove the body from common cars (now usually already a two-seater) and create something altogether more individual.

But that sort of thing isn't what Tiger Racing MD Jim Dudley does. As a fan of historic racing cars and drivers, he'd much rather do things the way they were. When he spotted a matching numbers 1939 Rover 10 for sale on eBay, he knew it had potential. But far from restoring it into a staid and sensible saloon, he opted to make his own aluminium body in the style of those post-war specials builders.

The ERA badged special fits in perfectly with the classic car work that Tiger Racing has incorporated into its portfolio in recent years. A number of classic restorations and modifications have passed through the workshop, and right now there's a bare metal rebuild of a Ford Anglia in the workshop. Once finished, it will have a breathed-on Ford Zetec engine and lowered suspension, amongst other tweaks. There's some historical context here, too. When Raymond Mays founded and ran ERA, the company modified road cars under its ERA Modified banner, which Tiger Racing – now owner of the marque – has revived for its tuned classics.

One reason the eBay purchase appealed to Jim was the fact that the design had been thoroughly restored with all the wearing components having been replaced. It was ready to receive the new bodywork. Well, almost. First there would need to be some engineering to ensure that the final car would have the right look. The engine was moved back on the ladder

chassis by about 10in so that the radiator aligned with the axle line. That had the knock-on effect of moving everything else back in the car, so that the occupants were also in a more conventional position. Consequently, the propshaft also had to be shortened. Remember that it started life as a box saloon. Jim hasn't been afraid to modernise the underpinnings in subtle ways. The cable operation for the clutch, for instance, has been replaced with rods, taking advantage of the rose joints that the Rover engineers didn't have access to back in 1939. The hardest part of the mechanical work? Getting the handbrake working properly.

Other mechanical work included relocating the gearlever and handbrake, and making and fitting a new fuel tank. The tank takes advantage of the lack of rear seats and measures a generous 11 gallons. Combined with the decent storage space in the boat tail, it means that the car is ideal for touring in the kind of historic events its 1939 origin makes it eligible for.

When it came to styling, Jim made a rough sketch before he set to creating it for real. He was inspired by an ERA grand prix car, and imagined what it might have looked like if a two-seater version had been made in period. Before the aluminium panels were made, outline tubes were fitted to the chassis that would later support the body.

The bodywork itself was made in-house, Tiger already having made a name for itself in offering its Seven-inspired models with the option of full aluminium bodywork. The body was formed in sections that were



Interior trim all made in-house by Tiger; ERA branded dials took the part in the bare aluminium dash.



welded together before being beaten into shape. Once the main body tub had been formed, it was time to move on to the details. The radiator grille, for example, is made from no fewer than seven individual pieces of aluminium.

As you'd expect, the dashboard is made from aluminium. Period toggle switches look the part, while modern instrumentation – made by ETB and branded with the ERA logo – should ensure that the read-outs are accurate.

Jim was able to take advantage of Tiger's in-house capability. The interior trim, for instance, was created in the factory and the car was prepared and painted on site too. The dark blue colour looks right for the era, and almost chose itself – Tiger had it left over in stock, having recently painted an ERA 30 in the same shade.

As much as anything, it's the detailing that enhances the overall appearance of the car. The big headlights, for instance, were an £1800 investment, but vital to the look of the car. Conversely, the big wood rimmed steering wheel was a bargain that Jim picked up as part of a job lot at an auction several years ago.

Some parts were available off the shelf; aside from the headlights, all the other lighting came from SVC, as did the aeroscreens. The hard wood boot rack is a one-off, made by a Tiger HS6 owner in

Tech spec

Engine as tested: 1939 Rover 10 four-cylinder.

Engine options: Erm, not really!

Chassis: 1939 Rover 10 ladderframe.

Bodywork: Bespoke two-seater aluminium bodywork.

Suspension: Leaf springs front and rear.

Steering: Steering box.

Brakes: Rod operated drums all-round.

Contact: Tiger Racing, Unit 10 Anglia Way, Wisbech, Cambridgeshire PE13 2TY. T: 01945 466200. E: jim@tigerracing.com
W: www.tigerracing.com

a similar style to the one he made for his own car.

The car was fresh out of the box when we photographed it in that limbo period between Christmas and new year, and it will undoubtedly benefit from the patina that some miles on the clock will bring. Its age means that the car can enter a number of historic rallies and other events, and will look great if it becomes a little weather beaten in pursuit of those outings.

And it's remarkably good fun to drive. It's the oldest car I've ever driven by some margin (second place going to a Lotus Six I drove five years ago that was also

owned by Jim) and I had very limited preconceptions of what 1930s motoring would be like.

Once you've climbed in, using the sturdy fold-down step, the cabin feels airy – not only because it's completely exposed to the elements, but also because there's a lot of space inside. The four-cylinder engine needs a deft touch to coax it into life on a cold December morning. A careful balance of choke and gentle throttle blips gets it into a steady idle before I head out on to the road.

One thing I was very aware of before setting off was the rod operated brakes. They're no worse than you'd expect, but you wouldn't particularly want to have to lean on them in a hurry. There's little pedal feel, and it takes quite some while for the drums to have any meaningful effect on velocity. It's probably the one area where the car feels its age. Another is in the gearchange which, thanks to a lack of synchromesh, doesn't like to be rushed and rewards double declutching. Adapt your driving to work in slow motion with the gears and the brakes, and it's surprisingly easy to get on with. It's remarkably conventional in so many ways.

Quicker than I was expecting, too – at least, it is in a straight line. I'll admit to not being terribly brave in pushing the

skinny crossply tyres to their limits in the corners. Not that I had any complaints about the steering and turn-in. Perhaps because of the modesty of the tyres, the feedback is more than adequate.

Weighting of the steering is also light, the big steering wheel giving you plenty of leverage. I found myself sitting low in the seat and looking through the steering wheel instead of over the top of it, and you soon begin to stick your elbows out and feel like you could take on the banking at Brooklands.

It's when you think that those pioneers of motorsport raced cars with similar technology (read: similarly terrifying brakes) and several times the power that you realise just how fearless they were.

The creation of this special has been as much for Jim's own entertainment as it is a showcase for the services that Tiger Racing can offer. Over recent years, the company has expanded to take on an increasing amount of classic car work, but it's still its own kit car models that form the bulk of its activities.

While a 1939 Rover couldn't be further from the raw and exciting models in Tiger's model line-up, at the same time it seems to fit in perfectly with what goes on in the Wisbech factory. ■



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Improving **WITH AGE**



Keith Baker's no-compromise build of a Southern GT GT40 replica was featured in-depth in the last issue of CKC. This month we take a close look at the finished article and drink in all the fabulous detailing.

Words and pictures: Ian Stent

As I chat through Keith Baker's future plans for his unquestionably spectacular GT40 replica, one comment sticks out. "I want to allow the car to weather, to get a patina." It's a comment I completely understand and applaud... the original cars were used and abused race cars that were never intended as concours queens. Worn leather seats, distressed paint, visible imperfections are a good thing in my book, but are easier to say than to allow to happen... particularly when you consider the meticulous build we featured in last month's issue, the fact the car is immaculate and, finally, cost the best part of £85,000. Would anyone actively encourage the onset of wear and tear on such a car? Really?

But the more we chat, the more one can see that Keith's serious in his intent, and indeed the process has already begun. Some of the stickers on the side of the car are already beginning to fade and get marked, but Keith does not intend to replace them. As we take the pictures and I comment





Black alloys and spinners add purpose to old school look.



Larger swirlpot to be fitted this spring.

Tech spec

Engine: Ford 302cu in V8 using 'Mexican' block, Dart Pro alloy heads, Eight Stack fuel injection and ECU. 458bhp

Gearbox: Quaife ZFQ 5-speed transaxle, Southern GT adaptor plate, AP Racing clutch.

Suspension: Front – Double wishbones, cast alloy uprights, coil-over dampers. Rear – Lower wishbones, top link arms, cast alloy uprights, coil-over dampers. All rose jointed.

Brakes: Vented discs all round with AP Racing calipers and Bembo rear handbrake calipers.

Wheels and tyres: Image 15in BRM style pin drive knock-on alloys. 215x60 R15 front and 295x50 R15 rear Avon tyres.

Interior: GT40 replica dash with Smiths instruments, GT40 style leather seats.

Exterior: Replica Mk1 GT40 bodywork, front side winglets, number roundels with lights, Gulf livery.

LOOK

No carbs here! Eight Stack throttle bodies give modern reliability to older V8. Wonderfully uncluttered engine bay.

Engine bored out from original 302cu in to deliver mighty 458bhp.

on how clean the Southern GT is, Keith laughs that it's the cleanest it's ever been... he tends not to worry about that and uses his cars whenever the fancy takes him, regardless of what the weather might be doing. So instead of pampering the Southern GT GT40 replica in his garage and waiting to use it on high days and holidays for longer driving experiences, instead Keith takes it to and from work, pops to the shops in it and generally enjoys it.

Backing up the desire for letting the car acquire the patina of age is the way in which Keith assembled it. Although he was never a slave to authenticity (as evidenced by the carbon inserts in the dash and door cards) he has still built the car with a brilliantly restrained eye... there's no glint or glamour here, no chrome air filters or ostentatious bling. So pop open the rear clam having released the beautifully authentic over-centre catches, and the small block Ford V8 engine looks wonderfully period and correct. The aluminium is already dulling nicely, the silencers are simply painted matt black and the Camcoated exhaust headers are subtle. What's particularly clever is that despite the old-school look, the specification of the V8 is both ultra serious and modern. Sat atop the engine are four downdraft style Eight Stack throttle bodies that look impressively like old carbs. Allied to the Eight Stack ECU tucked out of sight, they give the V8 a reliability and control largely unheard of with conventional carbs. And despite the modern specification, another feature of the engine installation is its simplicity... plumbing and electrics are largely hidden from view, to give an impressively clean and uncluttered look. I like it a lot.

In the cockpit it's very much familiar GT40 territory, with bare aluminium panelling, a replica dash layout and leather seats which, on the driver's side, comes complete with muddy marks where Keith stands on the squab when jumping in and out. But alongside the carbon inserts already mentioned on the dash and door cards, there's other evidence of Keith's willingness to modernise the car when it pleases him, or when practicality is more important than authenticity – as evidenced by the conventional lap and diagonal seat belt found on the driver's side, in addition to the harness... much more user friendly on a trip to Tesco!

As you can see from the pictures here, popping the front clam open reveals Keith neat upgrade to the standard kit package. Panelling the bulkhead area does two things... it helps to conceal the spaceframe chassis and make the centre tub look more convincing as a monocoque structure (as per the original car), and it also yet again simplifies the look in here by concealing



Pin-drive hubs look fab with spinners.



Lots of great detailing and early signs of wear.



Adjustable rear Gurney flap a quality touch.

the components normally on show on the front bulkhead (windscreen washer bottle etc). It's an upgrade we can see many people replicating with their own projects.

Painted by MechSpray in Rochester, the Gulf livery on Keith's car looks fabulous and the surface quality is hard to fault. Panel gaps are almost certainly far better than any original car and the overall impression is enhanced further by the large number of period style decals which add to the race look of this car. White racing roundels are a familiar feature, but the small illuminating lights are a good touch, as are other exterior additions, such as red light on the offside rear flank and the clear deflector on the front clam, in front of the driver to help deflect flies and debris off the windscreen. The adjustable Gurney flap at the back of the car is another welcome addition while the real tour de force for me are the black alloy wheels with knock-on spinners. Yet again, they reinforce the no-nonsense feel of this car and add great authenticity to the overall appearance and will, like everything else on the car, only improve as Keith works towards giving it the period patina he desires. In five years' time this car will only look better, not worse.

Having owned another GT40 replica some years ago, and having been a regular



Front bulkhead area has been panelled to look more like a monocoque.



LOOK

This car has a serious look, thanks to a good choice of wheels and tyres, plus endless great detailing that only reveals itself the more you look around the car.



track day hound with his previous Ultima GTR, Keith's extremely chilled out about his ambitions for the latest car he's created. Track days and foreign road trips are both things that might understandably be on any first-time GT40 owner's hit list, but Keith's been there and has the many t-shirts to prove it. And if he really wanted to push himself on the circuit, there's always his second Ultima which he's finishing converting from a Can-Am to GTR bodywork. That said, I suspect the Southern GT might see occasional action on his nearby Brands Hatch circuit, although a longer road trip abroad seems less likely... having been to many Le Mans races in the past, the reliability and comfort of more modern machinery is hard to ignore!

So for the time being there are a couple of minor jobs he has planned for the car over the spring months (including enlarging the fuel swirlpot and modifying the fuel tanks and breathers as a consequence) before just having fun with the car this summer.

Of course, it should be blatantly obvious to us all that someone who has built two

Ultimas, two GT40 replicas and is almost constantly restoring or building motorbikes, that Keith is unlikely to suddenly hang up his spanners... so what might tempt him next?

A top end Cobra replica might seem like an obvious itch he's yet to scratch, but it's perhaps too obvious... and too common a sight to really inspire Keith. That said, an earlier and more unusual 289 replica could be interesting and as Keith and I chat through suggestions, after the beautiful Hawk 289, conversation naturally moves to that same company's other model, the HF3000 Stratos replica. Although Keith admits to hating the Stratos styling originally (reminding him of a Triumph TR7!), it's a shape that has grown on him.

For the moment there is the Ultima to complete and a pair of classic bikes moving towards completion... and of course a GT40 replica begging for attention in the garage! Keith's unlikely to get bored any time soon.

Useful contacts

Kit: Southern GT, Botley, Hampshire. T: 01489 788345.
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The top end of the kit car scene seems to be in rude health in 2016, with customers prepared to invest significantly in cars of high quality and iconic looks, yet which remain a fraction of the cost of the genuine article, with far better practicality and running costs. When you see examples like Keith's Southern GT, it's easy to understand why. It's beautifully engineered, immaculately put together and the end result is stunning. What's not to like? ■



Silencers painted matt black. Just right.

MISSED PART ONE?

Read about the build in the February 2016 issue available at

completekitcar.co.uk



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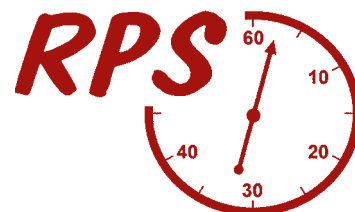
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TVR's self-build SWANS



What you see here is the end of an era. Supplied just weeks before the kit car industry was changed forever with the introduction of VAT, RGH 75L is one of the last – in fact, quite possibly *the* last – kits TVR ever sold. It's a relic of the time when household names like TVR and Lotus produced cars in kit form. And it's still owned by the man who built it in 1973.

"I'd always wanted to build a kit car, but I kept putting it off because I couldn't really afford it," recalls John Pickering. "With the introduction of VAT, the kits were disappearing and it struck me as my last chance."

Fortunately, that's not quite how things turned out, but the new tax regulations for 1973 did spell the end of a lot of kit production. Up until that point, cars sold in component form had been exempt from so-called purchase tax, making them substantially cheaper than their turnkey equivalents. When the changes were announced it triggered a scramble for the last remaining kits.

Could this be the very last kit-form TVR? It's almost certainly the only 1970s TVR that's still owned by its first keeper – and it has tales to tell...

Words and pictures: Chris Pickering

ONG





I built this

Name: John Pickering

Age: 74

Occupation: Retired electrical engineer

First car: 1932 Wolseley Hornet

Lottery win car: Jaguar C type or to be totally different a Doble E series DHC

Favourite tool: My trusty Colchester Bantam

Favourite thing about the car: It is a real miniature GT, not a GT badged saloon!



John Pickering used his TVR 1600M daily when new, including long trips across Europe. After a period in storage, it was recommissioned and is now back in regular use.

"I ended up with the TVR almost by accident," says John. "The Lotus Elans and Europas had dried up by that point, so it was a choice of the Ginetta G15 or the TVR M-Series. I only lived a couple of miles away from Barnet Motor Company [then TVR's main dealership], so that swayed me."

By the time he got round to visiting, they only had one example left, a 1600M built for the 1.6-litre Ford Kent engine

and finished in a suitably '70s shade of metallic bronze. Like a lot of kit cars of that era, the M-Series came as a trimmed body/chassis unit. In this particular case, Barnet Motor Company had taken things even further, fitting the rear suspension so the car could be pushed round the workshop like a wheelbarrow.

"Liam Churchill, who ran Barnet Motor Company, suggested I came in one evening to fit the front suspension," John recalls.

"The rack was already in place, so it was just a question of bolting on the wishbones, the uprights and the track rods."

With all four wheels now attached, the TVR was loaded onto a car trailer, with its engine sitting on a Ford Industrial pallet at the far end. Everything was supplied brand new and any parts not already bolted to the car were provided in a series of boxes. They were all taken from familiar sources for the 1970s kit car

FACT

TVRs were available in kit form to take advantage of purchase tax exemption. Kit production ceased when VAT arrived.



industry – steering rack and differential from the Triumph Spitfire; front uprights from the TR6; engine and gearbox from the Ford Capri 1600GT. All that was missing was the instructions. The closest thing you got to a build manual was a pair of camber diagrams.

“I didn’t have a garage at the time, so I had to borrow one from the house next door,” John recalls. “There was no electricity so I wheeled the car out to work on it during the daylight and wheeled it back at night.”

Not that there was a great deal of wheeling around involved, to be fair. The only major mechanical job was to fit the engine, which came with the gearbox already attached. The whole job took a little under a weekend.

Returning to Barnet Motor Company for a build check the following week, John discovered just how close he’d come to missing out: “A few days before I arrived, they’d been trying to get another kit out to a customer. Apparently they were leaving the factory gates with the car on a trailer when they were stopped by Customs and Excise. The wheels had been put on to make it easier to move and the revenue man said ‘if you take that out we’ll do you for every kit you’ve ever sold’. As far as I’m aware they never sold another kit TVR.”

If that was the last kit TVR, the bloodline was certainly about to receive a fitting send off. RGH 75L clocked up over 500 miles in its first week and it would go on to prove its GT credentials right across Europe.

“My girlfriend had a cottage just outside Villeréal in South West France,” says John. “We used to go down there regularly and we’d cover the journey in a day. It was 450 miles from the ferry port in Dieppe and there weren’t any motorways at the time so it was *route nationale* the whole way down.”

On one trip, the clutch cable failed part-way back and the pair had to complete the rest of the journey to London with the clutch operated by a length of fence wire. A few weeks later, the differential carrier broke and they had to lash the diff to the chassis with a jack handle and a length of sash cord.

On another occasion the dynamo gave up the ghost just as it was getting dark, forcing them to stop in Rouen: “We decided to get something to eat while we put the car on quick charge at a local garage. We got back about midnight only to discover the charger had a blown fuse and it hadn’t worked. Eventually we managed to get in touch with the garage owner who gave us some fuse wire, so I wound a load of that around the posts in place of the cartridge fuse and we went to sleep in the car. About three hours later we woke up when it went ping and

started heading back to the coast. It was a moonlit night and the roads were virtually deserted, so we drove more or less the whole way across northern France with no lights on, flicking them on whenever we saw someone.”

Long distance trips were to become a regular feature of life with the car. Now retired, John worked as an electrical engineer for an aerospace company: “At the time I was working on a project with the German space agency near Munich. Normally I flew, but I wanted to head on to Villeréal the day after so I drove down.

“I got away from Munich about midday and drove through Germany, Austria and Switzerland into Italy. The final stretch took me into France and over the Col de l’Iseran, by which point it was raining quite heavily, so I went up the pass in a thunderstorm with the peaks lit by flashes of lightning. I went down the other side into Val d’Isere and found a hotel to stop for the night. By the time I reached the cottage the following morning I’d clocked up over 800 miles.”

The TVR remained in regular use until John joined a new business in 1982, whereupon he got an Alfa Romeo GTV as a company car. It then lay dormant for the next decade and a half, surviving a house move to the other side of the country, fatherhood and eventual retirement. But that’s far from the end of the story.

When time finally allowed, John set about reviving the 1600M. If he got off lightly first time round, the rebuild was to prove somewhat more involved.

The biggest issue was the chassis.

Although the car had been dry stored, the sound deadening material sandwiched between the body and chassis had soaked up salt and rainwater throughout its time on the road, so the tubular steel structure now resembled Swiss cheese. But before that could be tackled he had to get the body off.

“It’s a very substantial chunk of fibreglass,” he comments. “I’ve now got an SSC Stylus and I can lift the body for that quite easily by myself, but I had to jack this one piece by piece off the frame. In theory it just unbolts, but the edge of the body wraps underneath the chassis, so there’s a degree of jiggling back and forth involved.”

Other areas also proved tricky. The rear wishbones were salvageable, but the bushes needed replacing and it turned out that the retaining pins had rusted solid. John had to saw through them and then drill the whole lot out on the lathe before putting some thin-walled bushes in to get it back to the original size.

Needless to say, the offending sound deadening material was left out in the final rebuild. The car is now somewhat noisier

Below: It was easier to find a parking space in North London in the 1970s! Here’s the TVR, freshly built. **Bottom:** Basking in the sun next to a tobacco field. The car spent a lot of its early life in Europe.





Despite considering modern power, John stuck with a Crossflow for the rebuild. Upgraded to a Vulcan 1700. Interior retrim was also a major part of the refresh. Sound deadening deleted!

as a result, but it's still relatively refined, with a surprisingly supple ride allied to decent suppression of wind and road noise. One thing John hasn't managed to sort entirely is the steering. Homemade modifications to the rack and column have removed a lot of the friction found in the original design, although it's still blighted with the same slightly unnerving lack of feedback. This is an M-Series trait that stems from the positioning of the uprights, which results in an almost total absence of castor.

For power, John has resisted the temptation of a modern Zetec or Cosworth

Tech spec

Engine: Vulcan Ford 711M Crossflow with gas flowed head and Kent BCF2 cam.

Gearbox: Ford Type 3.

Suspension: Front – TVR unequal length wishbones with Triumph TR6 uprights, coil spring damper units, anti-roll bar. Rear – TVR unequal length wishbones, TVR uprights, TR6 drive shafts, coil spring damper units.

Wheels and tyres: 15in TVR 'Finny' alloy wheels, currently Yokohama tyres.

Interior: Black leather cloth and carpets as originally supplied.

Exterior: Rootes Spice metallic finish as original.

transplant – both of which were discussed before the rebuild – and stuck with a Ford Crossflow. The original cylinder head had cracked due to overheating and he had his doubts about the integrity of the block, so instead a new 1700cc crate engine was ordered from Vulcan. Alongside the overbore, this new engine features a big valve head with hardened seats and a Kent BCF2 cam. Running on the original Weber 32/36 DGAV carburettor it's good for around 110bhp, giving sprightly performance in a 1035kg coupé.

Finishing touches included a full retrim, much of which was done at

home, including the fabrication of a new dashboard panel. It's also been resprayed in the original colour, which looks glorious under the bright sunshine of our Devon photoshoot, just as it must have done 40 years ago in the South of France.

A decade since it was put back on the road, John's 1600M continues to be driven regularly, making it perhaps the only one-owner-from-new 1970s TVR that's still used for the weekly shop. Rumours of the kit car industry's demise proved totally unfounded, of course. It may have been the end of an era, but it also marked the start of a whole new chapter. ■





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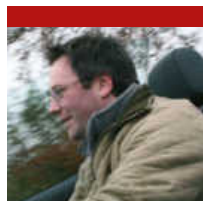


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Race Diaries

Our Race Diaries contributors have been kept busy with preparations for the new season. Here are their latest updates...



Alisdair Suttie

DISCIPLINE

Hillclimbing

RACES

Sylva Leader

CHAMPIONSHIP/SERIES

BHC Leaders
Championship

AGE

41

OCCUPATION

Motoring journalist



Stung to the core by fellow diarist John Pick's comments, I've been forced into a rethink of the Sylva for 2016 and how I will use it. Actually, John's comments made me laugh out loud and realise just how little I've used the car on the road, never mind on any hillclimbs.

So, for this year the plan is to use the Leader and get some race numbers on it now and again. This plan has also been foisted on me to a large extent by an engine builder who resolutely failed to live up to his description...

To save myself some time and hassle, I packed the engine and gearbox off to a specialist with the request to check over the motor and 'box, build them and join one to the other. Several calls and emails told me all was progressing well, even though the specialist was keeping the price down by fitting my engine's work in around other projects.

I decided to have a trip down to see how work was going, only to be met with an MX-5 engine and gearbox that looked remarkably like the ones I had dropped off several months earlier. No problem, I thought, these engines all look much the same.

Well, the reason the engine looked exactly like mine was because it was mine. It was even still on the same pallet I'd used to drop it off. Less than pleased with being told a few fibs, I packed the engine back into the car and headed home still with no complete engine but at least not



Above: Al's lack of use of his Sylva Leader hasn't escaped the attention fellow hillclimber John Pick.

having spent any money.

This has set progress back considerably and means there's no way I'll have time to make the engine swap in between work and family commitments, and finding a new garage as my current lock-up looks likely to be the target for a wrecking ball in the spring.

All of these shenanigans mean a new priority list that starts with repositioning the radiator to in front of the chassis crossmember. I know a lot of Sylva Stars and Leaders have the radiator behind the chassis but I'm convinced it cannot help with cooling, which can be marginal in my car on warmer days. Moving the radiator should be simple and I will

also fit a new mesh to the front air intake to stop leaves blocking up the radiator.

Also on the list is a full service for the existing engine, gearbox and differential, plus fixing a blow from the rear exhaust manifold. I suspected a cracked exhaust pipe, but it's just a new gasket needed, so again should be straightforward. Famous last words...

Then it's in with the new seats, though this will require moving the handbrake further forward on the passenger side of the tunnel. Another simple job? We'll see.

A very different plan compared to last year, but one that should mean I use the car and avoid being the subject of John Pick's comedy!

Below: Lots of Sylva Leaders and Stars have their radiators behind the chassis crossmember...



Below: ...but Al will relocate his. Cooling can be marginal on hotter days.





Jack Walton

DISCIPLINE
Circuit racing

RACES
Pro Comp LA Gold

CHAMPIONSHIP/SERIES
750MC Sports Specials

AGE
56

OCCUPATION
Production supervisor

Season's end normally comes with a list of great ideas and plans to carry them out over the winter. This year was no different. I went through my annual moan that I never get Boxing Day off work, leaving me unable to take part in the Plum Pudding meeting at Mallory Park. The last one I got to was eight years ago. The joys of working in the food production industry.

On December 20, my boss said: "Great news, you can have Boxing Day off". Too little notice to get an entry in, too little notice to change Christmas plans. Oh well, there is always next year.

As my job disappeared in January and I am no longer required, I may possibly get Boxing Day off this year. Anyway, on with the plan. With Christmas over and work in the garage to do, first item on the agenda was empty the accumulated rubbish out of the garage. Anything we had no space for went in there for a few weeks.

Having just received some high quality lengths of rubber floor matting, a good clearout took place ready for this year's preparation. The place looks really efficient now and kneeling on the floor no longer hurts.

Other than a little bit of bodywork filling or taping, there is the pressing matter of the dampers. I was fortunate in 2015, not one wet race. I had no wets that were approved for running in the 750 Motor Club Sports Specials, and I only had so much adjustment on the dampers. With the dampers set to zero, it was still

way too firm to be effectively raced in the rain, but absolutely stunning handling in the dry, real go kart style fun. But, while fun, more compliance is needed from a race car. I gave Matt at Procomp a call and he recommended that I do some checks and take some measurements. First thing was to remove one of the front dampers. I got one of the Avos off and removed the spring. The plan was to take the spring to my local oval racing former world champion, Ben Marjoram. These guys appear to spend more time corner weighting and suspension fiddling than any other form of motor racing I have come across and are certain to have a spring measuring machine. I gave him a call. "Nope, sorry mate, I don't have one". While having a brew and working on Plan B, I wiped the top of the spring, behold, 7/500 was scribed into the flat of the spring. 7in long and a 500lb spring. That could well explain some of the 'positivity' at the front end of the car.

A deal has now been done with Matt from Procomp for four new Protech dampers, damped, valved and correctly sprung for my car. This will be the second car I have owned that Matt will have 'breathed on'. Once fitted, it will be off to Procomp for a suspension set-up session. The last one was a Honda Fireblade powered Stuart Taylor, a lovely handling car.

The dash will also need some work. The emergency dash fitted for the four-hour relay race at Snetterton did its job but the plastic sheet I used,



Above: Gaffer taped dashboard is only temporary.

gaffer taped to the original dash, is not a stylish or long term option.

When time allows, a trip to the chaps at Nodiz Motorsport Electronics in Wiltshire is on the cards. This will allow me to set up my new Nodiz ECU on their rolling road and compare it to the Megajolt that is still fitted, though unplugged.

The calendar for 750 Motor Club Sports Specials has been published, just waiting for the regulations to be confirmed. Interestingly, a new MSVR series has just published a list of dates, which is intended to run an All Comers Series. These races attracted an eclectic mix of cars and experience but you will normally find someone to race against. The Armed Forces Race Challenge also have three races this year attached to the 750MC programme. Potentially, a very busy season... ■

Below: Garage was slightly over-run during the Christmas break...



Below: ...but has now been cleared out and improved with rubber floor matting.



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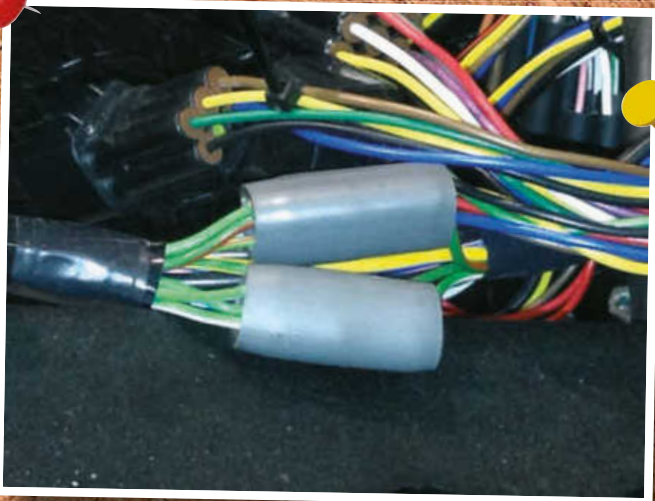
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Spyders Inc 718

Michael Oliver has an eye for authentic replication, his 718 RSK replica being the second high quality Porsche replica he's created. Adam Wilkins met him.

A Porsche Spyder replica wasn't at the top of Michael Oliver's list of cars to build when he first embarked upon a project. That honour went to the 356 Speedster. Over a period of six years, he assembled what could be the most authentic Speedster replica ever built, much of that time being occupied by sourcing the necessary parts. Rather than use a GRP kit, he sourced original steel Porsche panels and created a car almost indistinguishable from the real thing.

"If you're going to do a replica, it's got to be a good one, otherwise you end up with an expensive beach buggy," he says. He addressed all the usual replica giveaways, like relocating



Below: Michael's previous Speedster replica used genuine Porsche panels.



Below: Spyder floorpan: where it began!



Below: Spyders Inc body fits in a van.



Below: Gearbox was supplied by Volkswagen specialist in as-new condition.



Below: Red 9 Design suspension kit means the car gets coil-overs all-round.





Above: Four-stud wheels allowed big brakes.



Above: Double wishbones a Red 9 feature.



Above: Discs fitted.



Above: Four stud fitment will be hidden.



Above: Fuel tank was relocated from the front to behind the seats. Less risk of impact there!



Above: Consequently, fuel cap moved...



Above: ...to directly feed the tank.

the Beetle's handbrake from the centre tunnel to under the steering wheel, and also altering the shape of that centre tunnel.

Such are the values of genuine 356s that it would be hugely expensive to create a Speedster from real parts now – the value of spares has followed the value of complete cars skywards. Even when Michael was building his car, things weren't exactly cheap. A pair of doors, imported from the States, cost \$4000. That made for a nerve-wracking moment when he had to cut

them up to make them fit!

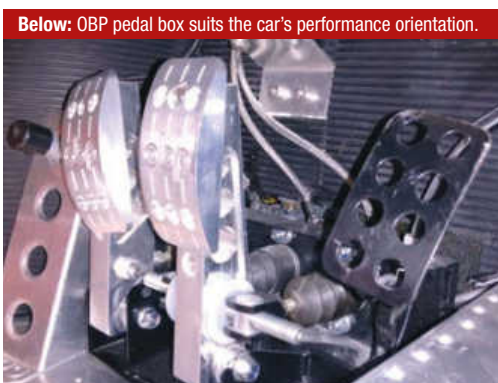
It was during the build of the Speedster that Michael sourced another Beetle base – and it would be a shame to let it go to waste. That's how the idea of following the Speedster with a Spyder came about. With a Beetle base already sourced, the next job was to find a body to go over the top. An eBay search threw up a company we've never come across before, but which was established in 2003, called Spyders Inc based in Cheltenham, Gloucestershire.

Michael bought the body panel kit in January 2015.

While Michael is adamant that a replica should be visually convincing, he's not so strict when it comes to the mechanical package. In fact, he'd far rather spec the car to perform at its best than adhere to old technology. Consequently, he ordered the independent rear suspension and upgraded front suspension packages from Red 9 Design (whose Madison you may remember we featured last year) that allows for coil-over

dampers all-round. Four-stud wheels were also chosen at this stage so that HiSpec calipers could later be fitted behind the wheels. You'd never know that the car has deviated from the five-stud originals, though, as the specially adapted spinners hide the stud pattern.

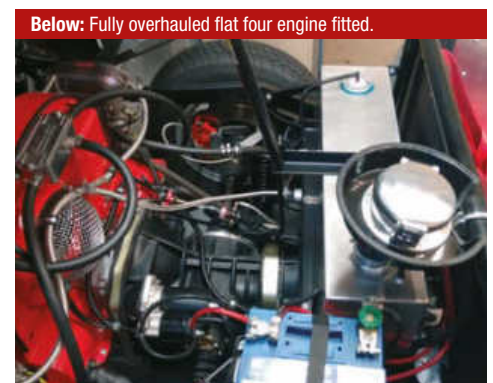
In preparing the mechanical parts, Michael enlisted the help of a number of reputable specialists. Red 9 Design supplied its proprietary running gear, modified the wheel spinner assemblies, fabricated the aluminium sections



Below: OBP pedal box suits the car's performance orientation.



Below: Passenger foot rest also OBP. Note it's left-hand drive.



Below: Fully overhauled flat four engine fitted.



Above: Raised floor disguises high tunnel...



Above: ...a usual replica giveaway.

and custom manufactured the door hinges. Kingfisher Kustoms was charged with rebuilding the 1675cc flat four engine, and adapting the gearbox.

When it all came back, it was time to begin the assembly. Michael's first decision was to relocate the fuel tank from the suggested position right up at the front of the car to the rear. That would mean the filler cap would be visually different to standard, but for safety's sake it was a compromise Michael was willing to make. An OBP pedal box went in, continuing the car's track focused specification.

As with his Speedster, Michael was intent on disguising the Beetle's tall centre tunnel. An aluminium sandwich floor achieved the effect, and left a cavity that could accommodate the wiring and pipework. That includes substantial half-inch pipes that run too and from the large oil cooler mounted at the front of the car. The 'false' floor also provided a solid platform on which to mount the bodywork whilst also reducing road noise.

Fitting the GRP panels, and ensuring that the panel gaps aligned neatly was easily the most challenging part of the whole



Above: Big oil cooler mounted up front.



Above: Underneath looking good as new.



Above: Looking in through removed grille.



Above: Vent panels tricky to fit neatly.

project, and the instructions that came with the kit were very basic. Simon Skelding of Red 9 Design assisted throughout this part of the project. The rear panel is formed from two panels – a main tub that hinges open, and another panel that's entirely removable. The original RSK was mid-engined and, since Beetle based replicas are rear engined, many builders opt to bond the two panels together to prevent them moving independently. Michael wanted to retain a shutline, so kept them as two pieces. In lieu of bonding the two panels together, Michael has reinforced the main panel with torsion adjustable aluminium strips that do the same job.

Additionally, a vent panel each side needs careful fitment. Michael opted to use countersunk fixings to keep it as subtle as possible.

Equally challenging was achieving a good shutline for each door. An adjustable mount brings the side of the car to meet

the door and, together with Red 9 Design, Michael has devised a sturdy cartridge on which to mount a solid hinge for the door. It's something that they plan to offer as a kit to other builders, as they were surely not alone in scratching their heads over the fitment of the doors.

Inside the car, the first thing to grab your attention is the red-trimmed seats. The shells for those are supplied in the Spyders Inc kit, and they were trimmed to Michael's spec by Rotherham Car Trimming Company. To disguise the GRP panels that would otherwise be visible through the eyelets, he has fitted a strip of aluminium behind each seat to give the impression that the car is panelled in aluminium. Neat!

Another detail that will fool the purists is the original instruments, with their green type on a black background. They weren't cheap, costing £1500 in their refurbished state, but there's no arguing they

Useful contacts

Kit: Spyders Inc, Cheltenham, Gloucestershire. T: 07885 492949. E: info@718-rsk.co.uk
W: www.718-rsk.co.uk

Suspension: Red 9 Design, Dinnington, South Yorkshire. T: 07538 572792.
E: info@red9design.co.uk W: www.red9design.co.uk

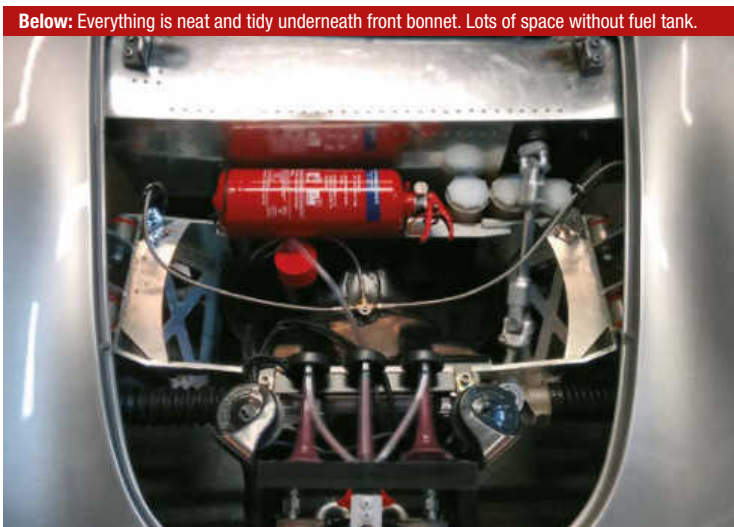
Engine rebuild: Kingfisher Kustoms, Smethwick, West Midlands. T: 0121 558 9135.
W: www.kingfisherkustoms.co.uk

Ignition system: Machine7, Nuneaton, Warwickshire. E: sales@machine7.com
W: www.machine7.com

Instruments: Palo Alto Speedometer Inc, California. W: www.paspeedo.com

Trim: Rotherham Car Trimming Company, Rotherham. T: 01709 914084.

Pedal box, fuel tank: OBP, Peterborough. T: 01478 812301. W: www.obpltd.com



Below: Everything is neat and tidy underneath front bonnet. Lots of space without fuel tank.



Below: Ali behind eyelet hides GRP surface.



Below: With Red 9 Design, Michael...



Above: ...made a bespoke door hinge...



Above: ...that they'll offer as a kit.

look the part – especially with their German language scripts. Michael called on California based VDO agent Palo Alto for those. Similarly period is the original Hella battery isolator switch, again complete with German language labelling. It's one of many neat touches that make you think 'classic' rather than 'replica'

**Don't miss part two in the
April 2016 issue.
On sale from Friday 4 March**

when looking at this car.

A job that was completed over the winter was the addition of structural looking tubing in the cockpit to continue the track focused appearance.

When you take in the numerous details of this car, it's difficult to believe that it was assembled comfortably in under a year, and the total build cost was a very reasonable £26,000. We'll be taking a closer look at the finished result in part two of the story next month. ■



Above: Period VDO instruments an indulgence that make a difference. Green script is original.



Below: Final touch for the interior was the structural looking tubes.

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THE COMPETITION

There will be nine winners of this competition. Entries close 11 March.

Question – Name the main cover car of this issue...

- A) Ultima Evolution
B) Southern GT
C) Gardner Douglas GD T70

The best way to enter is via our website at www.completekitcar.co.uk or email your answer to adam@performancepublishing.co.uk. Winners will receive one screwdriver set each. Thanks to Laser, Halfords, Sealey, Kraftwerk, Draper and Wera. ■



Contacts

(not regarding this competition)

Halfords **W:** www.halfords.com

Draper **W:** www.draper.com

Laser **W:** www.lasertools.co.uk

Sealey **W:** www.sealey.co.uk

Kraftwerk **W:** www.kraftwerktools.co.uk

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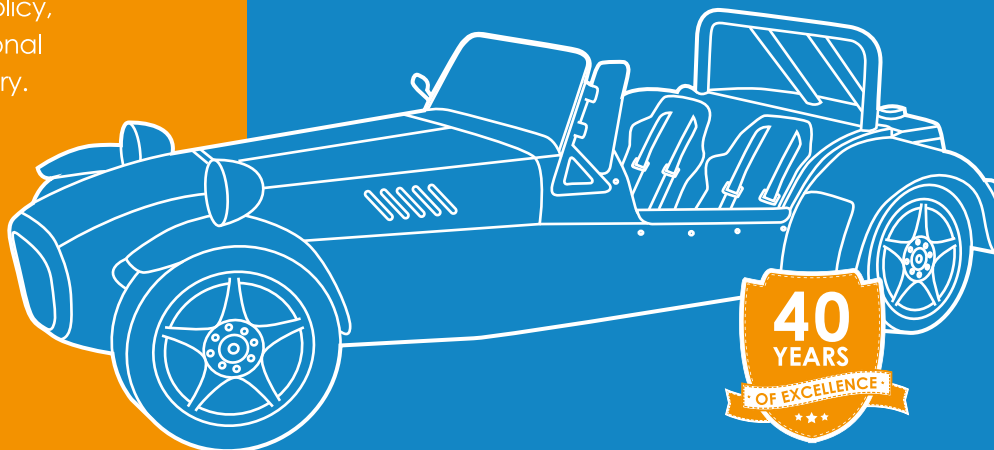
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Our Cars

James gets welcome pressies for the Nova and cures an old problem on the buggy, while John is busy working out what he needs to do on the UVA Fugitive. Stent and Wilkins have gone into winter hibernation... which is very similar to the progress they've made during the summer months too!



Above: Good news on Nova reservoirs – they fit!



Above: More money lavished on Nova canopy – pantograph wiper set up cost over £150!



Above: Nova canopy still demanding time. Old sealant needs removing pre-paint.



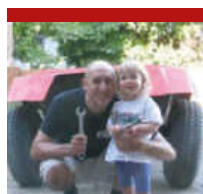
Above: Santa (Sarah) gave Nova remote canopy control system.



Above: Silicone remover, scouring pads and screwdrivers all used – took around four hours to do all windows.



Above: The gift for the man who has everything! Local metal fabricator made this and the buggy roll cage!



James Horsley

PROJECTS

Apal buggy and Nova

THIS MONTH

Nova roof repairs, plus alternator replaced on the buggy.

Happy new year all. The festive season saw some good progress on both cars. I have been back to Fellows Speed Shop to visit the Nova again and they are nearing completion. I was greeted by good news on arrival – the issue with the brake reservoirs reported on last month has been resolved, and they did not need moving. One reservoir had to be sunk lower, but they fit, clear the bonnet lip and the brakes are now commissioned. We then spent some time looking at ride heights and driving positions – real progress!

Back at home, the canopy for the Nova continues to suck up time and money. Luckily Santa (Sarah) provided the much needed remote system for the canopy electrics. I have gone for a similar system to that used on my last Nova, but this has a different remote design. The key fob has a sliding section to cover the buttons when in your pocket. A simple solution to sitting on your keys in a pub on a raining day and returning

to a soggy driver's seat!

Once the Nova returns, I plan to test fit the canopy and then send it for paint. That means any traces of old silicone on window rebates needs removing. I had hoped some silicone remover would help shift it, but this only loosened the top layer, so in the end I resorted to pan scourers and brute force! Four hours later I had no finger prints left, but pleasingly no silicone either. I did discover a few snapped off screws along the way which had been used by a previous owner to secure the side windows so these were ground down ahead of repairs.

Wanting to ensure I have done all drilling ahead of paint, I realised I also needed to source a wiper motor for the canopy. So my Christmas present to myself was a Durite Pantograph wiper motor, arm and blade. An expensive present at just over £150 but they are quality parts that I have used before on

my last Nova... so I know they will fit and work well. And after all, I do need to keep that expensive (order placed this month) unique screen clean!

One final Christmas present that I must mention was a bespoke garage hanging sign that Sarah commissioned. Unbeknown to me, Sarah had asked PAC Welding (who had previously made the buggy roll cage) to create me something for the workshop! A lovely piece, and a great example of metalwork skills. Thank you Sarah.

The time between Christmas and new year could of course have been spent relaxing, but where is the fun in that? Instead, I decided to fit the



Below: Wiring loom carefully labelled.



Below: James's dad made this trolley for engine removal years ago – still works!



Below: External regulator for dynamo not needed.



Above: Fan shroud and dynamo removed.



Above: Alternator is larger diameter than dynamo.



Above: Exhaust was stripped down to check leak and this hole found.

alternator I had found last report to the buggy. As ever, a simple job evolves. I initially felt too smug, having Googled the part number on the alternator and confirmed it was the alternator of choice for a Beetle, and even found a wiring diagram. However, when I started I soon remembered that I needed a different alternator stand due to the different diameters. Also the oil filler which runs through the alternator/dynamo stand needed moving to the new stand but wouldn't undo. So a few new bits were needed, but pleasingly I didn't have to change the fuel pump – some types can foul alternators.

As the fan shroud needs raising to access all the ancillaries I needed to remove the engine completely – there is no room above the fan shroud with the buggy body. This also meant I could investigate the exhaust backfire and leak. The suspect areas were joints between the four pipes and the central collector. What I wasn't expecting was a corroded section inside the joint. The exhaust is

second-hand and the ceramic coating had been damaged previously where clamps were fitted, and I presume water/condensation had collected in a joint and eaten away at the exposed pipework. When refitting the exhaust I paid plenty of attention to the joint areas using jointing compound to fill any gaps ahead of fitting clamps. On the side pipe slip joints some repair bandage was also wound around the joint ahead of being clamped. This then cures when heated and hopefully seals these areas to keep water out and prolong the life of the exhaust.

The final stage of the alternator conversion was to remove the wiring that runs through the voltage regulator. The regulator is needed for a dynamo, but is built into a modern alternator. Some wires could be spliced together for the indicator light on the dash, but the larger wires needed more care. Fortunately as my regulator is next to the battery under the rear seat I could easily re-route cables. The process

could also be simply reversed if I chose to fit a different engine that still had a dynamo fitted (it is often easier to buy a complete running VW Beetle engine).

All being well, the conversion will help keep the battery charged and give me a bit more confidence to fit some more electrical items – some accessory sockets for satnav are a priority, and then maybe some additional lights.

I was pleasantly relieved when the buggy started first time after these works. I let the engine and exhaust warm up for some time until I could see the exhaust jointing paste curing. So far it sounds quieter so I hope the leaks are sorted – the proof will be under deceleration, when we used to hear a small backfire. Initial voltmeter readings are good and seem to confirm that my old spare alternator is performing well. Slowly I am reducing the buggy 'to do' list – just the fuel gauge to fix before show season. Attention now needs to revert to the Nova again and reuniting the body and canopy.



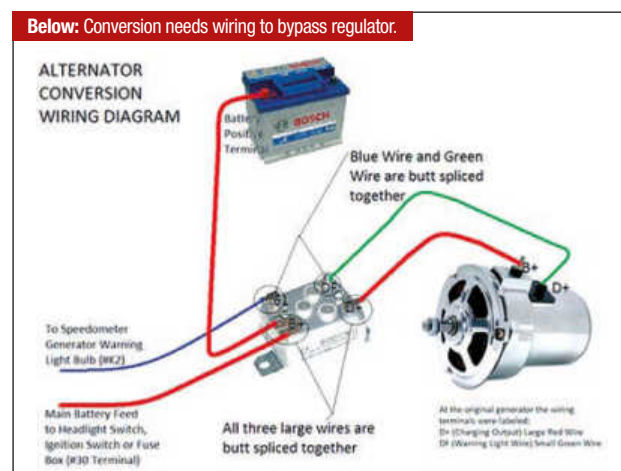
Below: All exhaust joints carefully resealed.



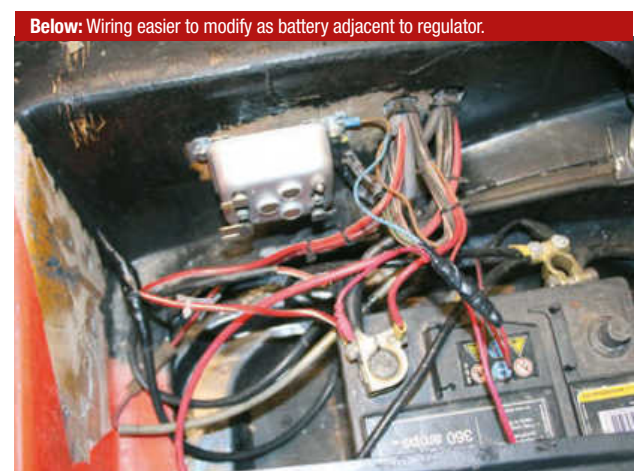
Below: Whole engine ready to be refitted.



Below: Suspension lifts with engine out, so engine needs raising on timber to align.



Below: Conversion needs wiring to bypass regulator.



Below: Wiring easier to modify as battery adjacent to regulator.



John Dickens

PROJECT

UVA Fugitive

THIS MONTH

Buying software for his ECU and planning for the location of new fuel supply components.



As always, Christmas and new year festivities take up a lot of what would normally be working time at this time of year. School nativity plays, carol concerts, discos and parties occupied about a week and a half in early December and I didn't go in the garage at all between Christmas and new year. Therefore, very little actual work has taken place on the car this month.

I have done a lot of planning though. The fuel injection installation needs quite a few additional components to make it work. Apart from the injectors, fuel rails and manifolds, I need a swirl pot, high pressure pump, filter, pressure regulator and pipework for the fuel system and the Megasquirt module, relay board, coil pack and wideband lambda controller need to be added to the existing wiring system.

All these components also need to be mounted somewhere in the engine bay. I intend to group them together in modules as I did with the low pressure fuel supply (pic above right) and mount them on separate removable boards on the inside of the engine covers. To work out how big these boards need to be, I need to have the actual components to hand so that I can arrange them to produce the smallest footprint with the best cable or tubing paths.

I already have the electrical units so I invested another £200 on eBay to buy the various fuel system parts too. While I was waiting for these to arrive I decided to sort out the Megasquirt tuning software as well. The original tuning software was called Megatune but this has been replaced by a more versatile program called TunerStudio. A second program called Megalog Viewer, although not essential, is highly recommended. Free versions, with limited functionality, are available but the full versions were on offer as a pair for \$79.99 (£55) from EFI Analytics so I bought these. I had upgraded my laptop to Windows 10



Above: John's original low pressure fuel supply module.

a while back and, as many people have found, this is by no means bulletproof. So it was with some trepidation that I set about installing these programs but they both went in with no problems and the registration keys worked perfectly too, so they both seemed to be up and running.

The next step was to get the computer to talk to the Megasquirt ECU. This is slightly complicated by the fact that the ECU uses a serial port with a 9-pin D-socket and my laptop, like most modern units, only has USB sockets. There are a number of USB to serial adaptors available but apparently not all of them work with the Megasquirt... so to be safe I got mine from Triggerwheels for £14.50. This also installed perfectly so I rigged up a temporary 12v supply using a mains adaptor and connected up the Megasquirt ECU.



Below: This USB to serial adaptor was needed to connect up the ECU.

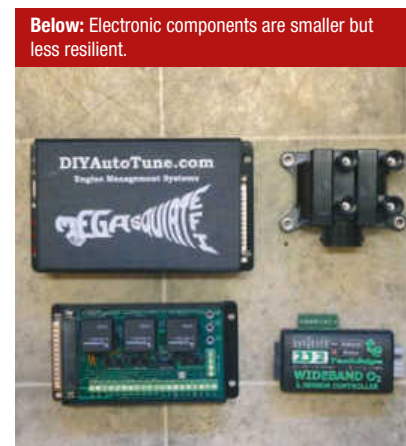
I downloaded the latest firmware from the EFI Analytics website, fired up TunerStudio and successfully installed the firmware into the ECU. At this point I decided to quit while I was winning!

The remaining fuel components arrived the next day. I will have to be very careful when I arrange them as they are quite bulky. The electrical components are more compact and should be easier to mount although the actual Megasquirt unit is not waterproof and is not supposed to be mounted inside the engine compartment. Sadly, in my car, the engine compartment is probably the most waterproof area.

The next step will be to connect the Jim Stim engine simulator to the Megasquirt ECU so that I can practice setting up and tuning using the software. I will report on this next time. ■



Below: The high pressure supply fuel components are quite bulky.

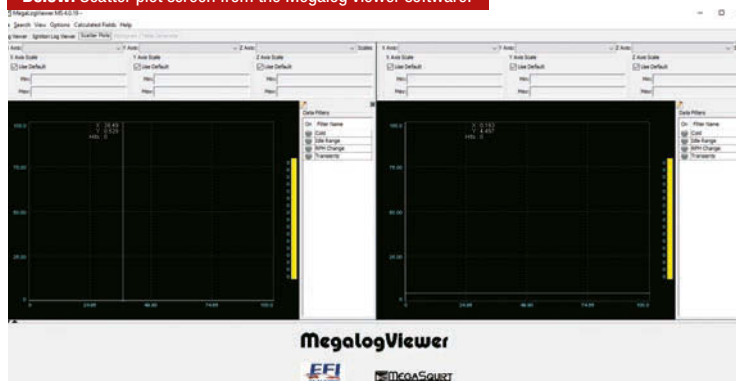


Below: Electronic components are smaller but less resilient.

Below: Gauge cluster screen from the TunerStudio software.



Below: Scatter plot screen from the Megalog Viewer software.



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Rust Prevention

When Bertini had an appointment with Rustbusters, we tagged along to see what's involved in halting the spread of tinworm on a steel monocoque based car.



Rust isn't traditionally a topic close to kit car builders' hearts. With the proliferation of GRP and/or aluminium bodywork, together with sturdy chassis, tinworm isn't the big issue for kit car owners that it is for owners of classic cars. But with the trend towards bodykits that retain production car monocoque structures, it's a problem that will face increasing numbers of readers of this magazine.

So what can you do to prevent the basis of your body conversion turning to dust underneath the shiny new panels? We visited Rustbusters with Bertini and its BMW Z3M based GT25 to find out. While we were there, we also discovered how the company can help owners of more traditional kit-built cars, too, but we'll come to that later.

When we arrived at Rustbuster's home in Spalding, Lincolnshire, Anthony Cherry was already there with his gleaming metallic red GT25. He'd decided to have the rust-prevention done because the Z3M base of the car is the rare range-topper of the Z3 range.

The first job was to thoroughly pressure wash the underside of the car so that it was easier to see any corrosion once the car was raised on the lift. Once the car was in the air, the team set to work stripping back any remaining grime to see what was beneath. Before the rust-proofing can be applied, you need

to know that you're starting with a solid base, making any repairs as necessary. A wire wool wheel is used to remove the more stubborn remains.

To get a clearer look inside the wheelarches, the wheelarch liners also needed to be removed – which proved a little tricky and time-consuming,

Below: Bertini's BMW Z3M based GT25 arrives at Rustbusters to ensure it's as shiny underneath as on top.





Above: First job is to pressure wash the underside of the car before going on the ramp.



Above: The initial inspection begins, which will involve removing the wheelarch liners.

but not impossible. In one of the front wheelarches, there was a small corrosion hole that could easily be plated, and in one of the rear arches a vestigial bracket had also corroded. The later could simply be removed.

Those were much easier to fix than the discovery that was to come later. Lots of modern cars have underfloor sound deadening material to reduce noise and increase perceived quality. It's particularly common with German marques, and the Z3 is no exception. The trouble comes when the material is adhered in one piece across panel gaps, giving any water no way to escape. It's almost impossible to tell whether there is rust under this layer, but one giveaway is if the foamy layer of material is sodden. It was the case in one area underneath the Bertini, so the sound-deadening material was stripped away. Sure enough, a hole in the floor was revealed that you simply wouldn't have known about by getting on your hands and knees and looking

underneath the car.

Where it might have been possible to complete the rust-proofing treatment in a day if no serious problems were found, this discovery meant that the Bertini would be kept in for the welding work to be completed. Adding to the complexity of the job was the fact that the hole in the floor was aligned with a crossmember which had also succumbed to corrosion. It meant that the seat and some interior trim would need to be removed before any welding could commence.

Once the floor and crossmember were repaired, the area was treated with high-build epoxy (EM121) and the seam was sealed with Sikaflex. Before the carpet was replaced, and as an aside to the rust-proofing treatment, the company fitted Dynomat sound proofing material inside the car to perform the role of the material that had been removed from the outside.

With the car retrimmed, it was time to turn attention to the underside.

First, any loose rust is removed. "You need to get down to the 'ginger substance,'" says Rustbuster owner Ian Allen. "That's the surface of the steel." That ginger surface is then treated using FE123, which is applied by brush to ensure that it's worked into the steel. The FE123 changes the nature of the surface from iron oxide – or rust – to iron tannate, which is inert. In years gone by, other materials would have been used to convert the rust into iron phosphate, but tannate is more

Who is Rustbuster?

Rustbuster founder Ian Allen is no stranger to the world of specialist cars, having spent several seasons racing a bike-engined ADR built by T5 Developments with the 750 Motor Club. He established Rustbuster in 1998 having worked in the rust-proofing industry for many years, offering services to heavy industry. That side of the business is still going strong, and it's the company's hands-on knowledge of the products it uses and retails that gives it a USP in the automotive market.



Below: Power tools used to get down to the metal.



Below: Working down to the corrosion to see what's what.



Below: Inner wheelarch all cleaned up.



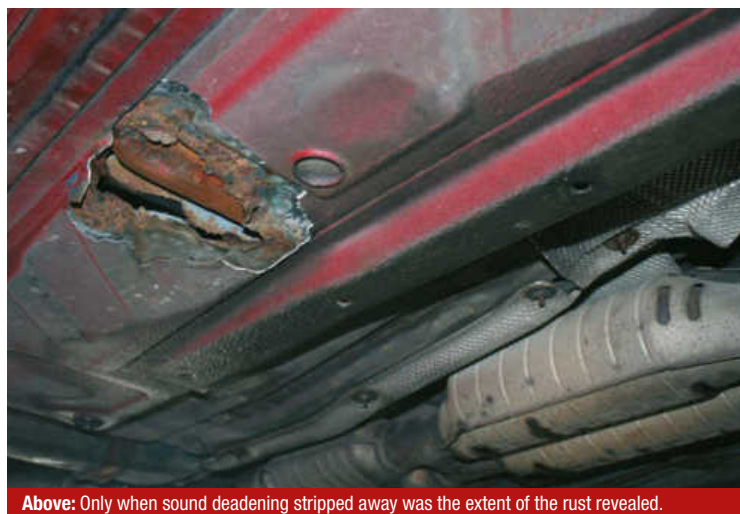
Below: Small hole found in front wheelarch.



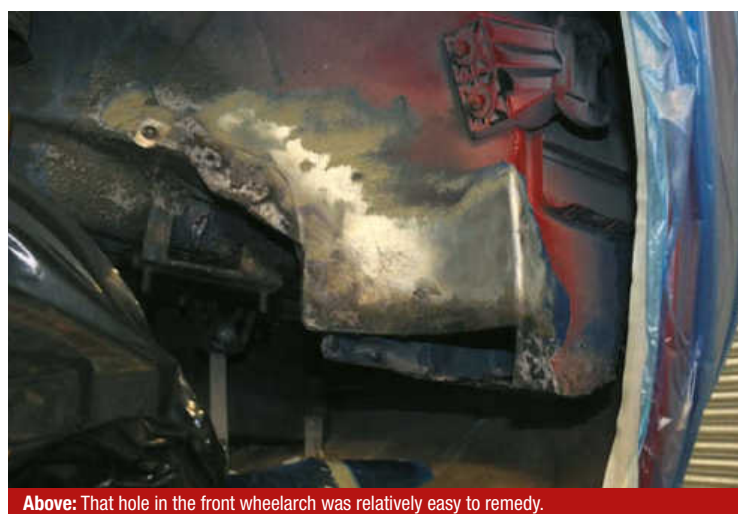
Below: This rusty bracket isn't doing anything; can be cut off.



Below: Wet soundproofing was clue to rusty floor.



Above: Only when sound deadening stripped away was the extent of the rust revealed.



Above: That hole in the front wheelarch was relatively easy to remedy.

How much will it cost?

There's no easy pricing structure for rust-treatment, because the final bill will vary depending on how much welding and other remedial work is needed before the treatment can commence. The price treatment itself starts from £250 plus VAT. One thing Rustbusters does recommend with classic car owners to have the treatment done before any restoration work is carried out so you know what basis you're working with. The parallel here is to have it done before a body conversion is made. However, various levels of treatment are offered to suit different budgets and the company does have space to store cars for longer-term work to help spread the cost.

environmentally friendly.

Next is to inject any cavities with

a penetrating wax that works its way into all seams. This was put into the front and rear subframes, as well as the sill, suspension components and anywhere else water might be able to access. Here's where the treatment is particularly relevant to spaceframe chassis cars, as Rustbuster's range of nozzles include those that are small enough to travel inside chassis tubes.

Finally, the whole underside of the car is finished off with Dinitrol 4941. On an older car, such as the Z3M that's underneath the Bertini, this gives the car a uniform finish in black. For a freshly built car using all new components, there's the option of a clear finish to retain the 'newness' of the appearance. Then it's simply a

case of refitting the wheelarch liners and the wheels, and the car is ready to tackle a wet British winter. Rust prevention is such an 'invisible' job that it's one many car builders don't think of. Converting a Z3 to a Bertini is hugely satisfying, because you see it transform before your eyes. After a rust-proofing treatment, it will look no different... but you'll know that the metal structure will be protected for years to come – so rust needn't be a headache. ■

Useful contacts

Rustbuster, Unit 2 Welland House, Cradge Bank, Spalding, Lincolnshire PE11 3AN.
T: 01775 761222. W: www.rust.co.uk

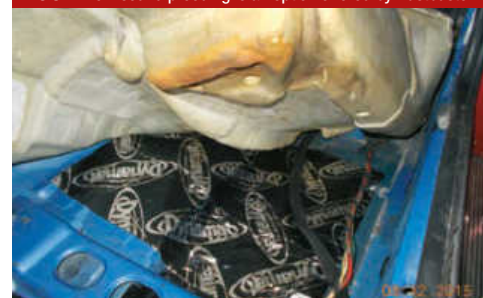
Below: All corrosion cut away and a neat hole made.



Below: Same hole from inside car – note all trim removed.



Below: New sound proofing is an option offered by Rustbuster.



Below: Once inner arches that needed fixing were fixed, it could be treated to prevent future rust.



Below: It's the same story with the floor, which is now looking as good as new. Job done!



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Wiring Looms

Please excuse me if I sound like I'm trying to teach granny to suck eggs... I'm well aware that a lot of this will be second nature to many of you. However, I still remember the anxiety and aggravation that came with wiring my first kit car, so hopefully this will be useful to someone.

As an aside, my first kit was a Robin Hood, and it was supplied with what was known as the 'Vicky Green' wiring loom. The background story was that Vicky Green was the wife of a long-suffering Robin Hood builder who was bogged down with the wiring of his car. However, the loom was in fact so simple that she fitted it for him one afternoon whilst he was out. The reality was that Vicky Green never existed, and the whole story was concocted to reduce the number of calls to the factory, on the basis that no-one was going to admit they were struggling if a girl could do it!

Different times, perhaps, but it helped me to realise that an awful lot of a kit car wiring loom is pretty straightforward. Engine control units (or ECUs) are obviously much more involved, but they can usually be

considered (and worried about...) as a separate self-contained sub unit that connects to the main loom with surprisingly few wires.

Building a loom from scratch is not as daunting as it first appears. Using a donor car wiring loom is an option, but it's unlikely to be exactly the right size and very likely to be unnecessarily bulky and complicated. Most Sevens don't have electrically adjustable wing mirrors, for instance. A bespoke homemade loom has the potential to be neater, simpler and much easier to fault-find, providing you remember to draw a diagram to go with it.

That said, even a simple kit car loom will use around 100 metres of wire. Correctly colour-coded wires are available from various sources, but the cost soon mounts up, and it's almost impossible to predict exactly how much of each wire you'll need before you start, which is frustrating when you grind to a halt because you didn't order enough yellow with a black tracer, for instance. A cheaper, and more convenient option is to raid your donor loom. Once the tape or braiding is peeled away, the wire is often in remarkably good condition, and all the

Ed Morton talks you through the basics of planning and creating a wiring loom from scratch. Here's what you need to know.

diverse colours, tracer colours and wire gauges are present and correct. It's very satisfying to use the correct colour coding for, say, left and right dipped beam, just because you can.

Guidelines for wire sizes for various uses are widely available (those listed here are courtesy of Car Builder Solutions), but if you re-use a donor loom's wire for the same job in your own car you can't really go wrong.

Wire Sizes...

5 amp (0.65mm²/9 strand) stereo, electric aerial, washer pump, map light, single horn, alarm, hazards, number plate light.

8 amp (1.0mm²/14 strand) electric windows, rear fog light, brake light, cigar lighter, heater motor and fan.

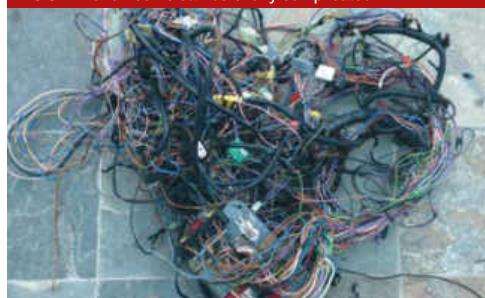
17 amp (2.0mm²/28 strand) halogen spot/fog lamps, heated rear window, twin horns, wiper motor.

27 amp (3.0mm²/44 strand) headlamps, ammeter, air horns.

35 amp (4.5mm²/65 strand) battery to alternator and ignition switch.

Obviously, the British Standard wiring colours (or BS AU7...) don't apply to all donor vehicles or looms, but it's a

Below: Donor looms can be overly complicated.



Below: Donor fuse boxes are usually not suitable for kit cars.



Below: It is possible to salvage cabling from a donor loom.



Below: Multi-core trailer cables can be useful, but make a note of the colour coding you use.



Below: Always leave some excess length on cable runs to allow easy removal of components.





Above: Battery should be located in a tray to avoid damage.



Above: CBS's wiring module makes wiring a car much easier.



Above: An aftermarket ignition switch.



Above: Plan your wiring to include all warning lights etc.



Above: This neat tool allows you to crimp large battery leads.



Above: Make sure you cover the battery terminals.

reasonable place to start and can simplify fault diagnosis, even if you haven't followed the standards slavishly. If you can live with non-standard colour coding, multicore trailer cable can be used as a source of wire – just make sure you make a note of your coding scheme.

Donor ECUs have their limitations, but can be a very cost-effective route to becoming mobile, and they should pass the IVA test without problems. Geoff Watson, of Watson's Rally in Wakefield uses the various Rover MEMS ECUs in K-Series engine conversions for classic Minis, and was a mine of information for my Minx beach buggy. If you supply him with a K-Series ECU and engine loom he can test it, deactivate the immobiliser and simplify the engine loom so that it'll plug into your main wiring harness for an entirely reasonable £180.

PLANNING THE LOOM.

To start with, decide exactly where each component is going to live. The exact location is important, because it determines the length, direction and location of each cable run. A bit of slack cable is useful behind lights and instruments, so that they can be pulled away from their housings and disconnected.

Here's a checklist of components to locate...

Battery – This needs to be isolated from the passenger compartment, and be reasonably close to the starter motor. It's worth bearing in mind that spilt battery acid can cause havoc in an engine bay, so some sort of impervious plastic tray for the battery to stand on is a good idea.

Fuse and relay box – It's perfectly feasible to reuse a donor fuse and relay box, although as with donor looms, they can be bulky and unnecessarily complicated for relatively simple kit car looms. Modular fuse and relay systems are available, and Car Builder Solutions can supply a ready-wired fuse and relay module, which in my experience will pay for itself repeatedly with the amount of head-scratching time it saves.

Fuse/relay boxes are usually mounted under the dashboard or on the engine bay bulkhead, if you can keep them waterproof. It's worth keeping them reasonably accessible; you'll be running at least twenty odd wires into it and this is easier to do if you're not grovelling in a footwell or standing on your head.

Ignition switch – Aftermarket switches are available that mount very simply through a hole in your dashboard, but donor steering columns and ignition switches provide an IVA friendly steering lock, so it makes sense to use them if you can.

Fuel pump – Electric fuel pumps are usually mounted under the fuel tank – most pumps are designed to push fuel rather than pull it, but obviously check with your pump's manufacturer.

Lighting – Headlights and rear lights, indicators, brake lights, reverse lights, fog lights, number-plate lights plus any interior or engine bay lights (or you could keep an LED head torch in the car).

Horn(s)
Radiator fan
Instruments and dashboard

warning lights
Wipers and windscreen washers
Heater/demister fan
Dashboard and possibly steering column switches – To control lighting (including the brake light switch and reversing light switch), horn, washers and wipers, heater and demister fan, handbrake switch and brake reservoir fluid level switch.

In car entertainment – If you must...

ECU and engine loom – Although the engine loom and ECU wiring looks complicated (because it is...) the only bit we need to worry about is the connection into the main loom, which is relatively easy to understand.

Air-conditioning, coffee machine, etc, etc.

DRAWING THE LOOM

Next, draw a large schematic diagram (A2 size is good) and decide how each component connects to everything else. This diagram can get quite involved, but the goal is simply to identify each connection – it's vital to get this clear before any wires are put in place. Locating the wiring runs comes later. Workshop manual circuit diagrams can be a useful reference source, but are hopelessly complicated for modern cars. However, a diagram for, say, a 1970s Mini will fit neatly onto single page, and will probably cover most of the circuits needed for a simple kit car.

Returning to our list of components, a basic list of connections might include;

Battery – The battery needs a large positive cable (around 25mm²) from

the positive pole to the starter motor positive terminal, which then connects to the alternator positive terminal, the engine loom and the fuse and relay box. A similar sized earth cable runs from the negative pole to the chassis. These cables are widely available, or you can make your own using a hammer powered crimping tool. It's worth using rubber or plastic covers on these terminals, as kit car engine bays can be quite confined and it's quite easy to inadvertently short the positive terminal to, say, the bonnet. Ask me how I know...

Ignition switch – The ignition switch connects to the battery with a brown wire. The key has three positions; the first is 'acc' (for accessory), the second 'ign' (for ignition) and the final one 'start'. As the key moves through each position the switch connects the battery to each group of circuits in the fuse/relay box.

'Acc' position, for accessory circuits, such as to the radio.

'Ign' position, for ignition-controlled circuits, including the fuel pump, ECU or coil supplies.

'Start' position, for the starter motor solenoid. When the key is in the spring loaded 'start' position the accessory circuit is briefly disconnected (this is why the radio switches off when you start your engine) and the battery feed to the ignition switch is connected to the starter solenoid by a white/red wire.

The solenoid then connects the battery to the starter motor, which then hopefully starts the engine.

Fuse and relay box – This is where the diagram can get complicated, so stealing small children's coloured pens might be in order. The fuse box has a supply directly from the battery and from the ignition switch. Outputs can run either directly from a fuse to a switch and then to the component (such as the brake light) or for components that use higher currents (such as the horn or radiator fan) the switch can operate a relay that controls the output from the fuse.

In its simplest form, a relay is a high current switch. Most dashboard switches are rated at around 10-20 amps, which isn't enough to feed hungry headlamps and radiator fans. A relay combines a low current switching circuit (terminals 85 and 86) that controls a higher current supply (terminals 87 and 30).

Unfused wires directly from the battery (such as the ignition switch supply) are coloured brown, and fused supplies (such as to the horn) are coloured purple. Both of these feeds will be live when the ignition is switched off. Wires from the fusebox that are controlled by the ignition switch are coloured green or white, with thin tracer colours to identify their individual functions.

Fuel pump – A white purple wire from the fusebox or ECU.

Front and rear lights – A blue wire from the fusebox to the light switch and outputs to the side (red), dip (blue/red) and main (blue/white) beam lamps. These feeds can run directly to the lamps, or operate relays that control the final supply. As a further refinement, the left and right side headlamps are sometimes wired and fused separately, so that a blown fuse doesn't lead to complete darkness.

The fog lamp supply to the fog lamp switch (red/orange) is taken from the dipped beam supply, so that the fog lamps only work when dipped beam is on. If the fog lamps are controlled by a simple on/off switch they will turn off when the headlights are turned off, but if they aren't also switched off separately they'll come on again the next time that the headlights are switched on. This arrangement will fail the IVA test, but CBS sells a module that solves the problem, in that the fog lamps switch off with the headlights and have to be deliberately switched on when you need them again.

A light green/brown wire from the Indicator flasher unit to the indicator switch, then green/white wires to the right side indicator lamps and green/red to the left.

A light green/pink wire from the hazard flasher unit to the hazard

Below: Ignition switch wiring. Brown battery, white ignition and green accessory.



Below: Relay in situ. Red/black wires control the switch. Orange supply the power.



Below: Here's CBS's neat fog lamp module for IVA.



Below: All that's needed to connect the ECU to the main loom. Not as complicated as you thought.



Below: Multi-plug connectors allow body to be lifted off Ed's Beetle floorpan.



switch, which then splices into the indicator lamp feeds. The easiest way to manage this is with a purpose made hazard switch.

A green wire from the fusebox to the reverse light switch, and a green/brown wire from the reverse light switch to the reversing light.

A black/light green wire from the fusebox to the brake light switch and a green/purple wire from the brake light switch to the brake lights.

Horn(s) – A purple/black wire from the horn switch to the fuse/relay box, and a purple/yellow wire from the fuse box to the horn.

Radiator fan – Either a black/green wire from the ECU, or a black/orange wire from the radiator thermostswitch.

Instruments and warning lights – A brown wire from the battery for the clock and voltmeter

A brown/yellow wire from the alternator 'ign' terminal to the ignition warning light. The other side of the ignition lamp connects to the 'ign' terminal of the ignition switch. When the ignition is switched on the ignition warning lamp circuit supplies an 'exciter' current to the alternator through the 'ign' lamp to start the charging process, and so the lamp is lit. Once the alternator is operating and producing charge, each side of

the ignition lamp is then connected to a 12V supply, so the current flow stops and the lamp turns off. Some alternators are 'self-exciting', in that they don't need an exciter supply, so the ignition-warning lamp isn't required.

A red/white wire from the sidelight circuit for instrument lighting.

Signals from engine senders...

Green/blue from the coolant temperature sender

White/brown from the oil pressure gauge and warning light

White/black or brown/black to the rev counter

Green/black from the fuel level sender

Black/yellow from the speedometer sender

Most aftermarket instruments are supplied with suitable senders, but original equipment senders from the donor engine loom can sometimes be pressed into service. Alternatively, the donor instrument cluster (which will be compatible with the engine loom) can be re-used, but Ford Sierra dials might not look too brilliant in your Cobra replica.

Signals from the lighting circuits...

Red/white from sidelights

Red/orange from foglights

Blue/white from main beam

Handbrake warning light and brake fluid level sender – These functions are often combined. A switch on the

handbrake closes when the handbrake is applied and sends power to a warning light on the dashboard. This light is also activated by a float-operated switch in the brake fluid reservoir if the fluid level falls below a set point. In this way, the low brake fluid level warning lamp is tested each time the handbrake is applied. Black/white wires are generally used for these circuits.

Wipers – Wiper motor wiring varies with the motor being used. However, the highly adaptable Lucas unit with a 5-pin control plug finds its way into the majority of kit cars. Different speeds and the self-park function are achieved by connecting various combinations of pins on the controller plug (3 and 4 for slow speed, 5 and 4 for fast speed and 2 and 5 to self park. Pin 1 is always earthed). There are various ways to achieve this – either with a purpose made switch, or standard on-off switches coupled to change over relays (Car Builder Solutions can supply a diagram). Wire colours are pin 1 black, pin 4 green, pin 2 brown/light green, pin 3 red/light green and pin 5 blue/light green. The wiper switch will also need a power supply using a green wire from the fusebox.

Washers – A green wire from the fusebox to the washer switch, and a light green/black wire from the washer switch to the washer motor.

Below: Chassis earth point with heat shrink protection on wires.



Below: There are lots of good ways to sheath a loom.



Below: A proper ratcheting crimp tool is a good buy.



Below: Different bore bullet connectors... use the right size for the job.



Below: A proper bullet connector crimping tool will help to guarantee lasting connections.



Useful contacts

12 Volt Planet T: 01491 838761. W: www.12voltplanet.co.uk
 Auto Electric Supplies T: 01584 819552. W: www.autoelectricsupplies.co.uk
 Autocar Electrical T: 0207 4034334. W: www.autocar-electrical.com
 Autosparks T: 01423 506133
 Car Builder Solutions T: 01580 891309. W: www.carbuildersolutions.com
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 Connectomotive T: 01584 759379. W: www.connectomotive.com
 IEM Services T: 01209 214086. W: www.thewiringproject.co.uk
 Simtek T: 01706 854857. W: www.simtekuk.co.uk
 SVC T: 01827 67714. W: www.s-v-c.co.uk
 Vehicle Wiring Products T: 0115 9305454. W: www.vehicleproducts.co.uk

Heater/demister fan – A green wire from the fusebox to the heater fan switch, then a green/yellow wire from the switch to the motor slow speed terminal and a green/slate wire from the heater fan switch to the motor fast speed terminal

Stereo – A white/pink wire from the fusebox.

ECU and engine loom – This sounds daunting, but bear in mind that the Minx buggy with a Rover K-Series engine needed just eight wires running to the ECU and engine loom, once the cunning Geoff Watson had finished with it. These run from the ignition switch IGN terminal (white), to the radiator fan (black /green), to the fuel pump (white/purple) and five wires to the instrument panel; ignition warning light (brown/yellow), rev-counter (white/black), oil pressure light (white/brown), speedometer sensor (black/yellow) and water temperature gauge (green/blue).

ROUTING THE LOOM

Armed with this diagram, and with the car in front of you with the major electrical components in place (or at least with their locations decided upon) it's time to decide where exactly to run each group of wires.

It will probably make sense to have two main bundles of wires running from the fusebox, one to the front of the car and one to the back. Instrument

wiring can be combined, as can the wiring to the ignition switch and steering column stalk controls. Each bundle is routed to avoid moving parts and heat sources, and should run separately to the fuel lines, or at the very least above them. It's helpful to assemble each bundle through loose cable ties until each wire is in place. Once each circuit has been tested then each bundle can be bound together permanently with tape.

This is your opportunity to take advantage of the inherent flexibility of a homebuilt loom – for instance, in the Minx buggy; the bodysheet wiring can be disconnected from the chassis loom, so that the body can be lifted off. This wasn't an option with the original MGF.

EARTHING

Most components will need to be earthed. As I'm sure you are aware, in steel bodied cars this happens by simply bolting the component to the bodysheet, which is in turn connected to the negative terminal of the battery. In a GRP bodied kit car, this isn't an option, so the chassis has to be used instead. Although the obvious approach is to separately earth each component, the loom will be far neater if earth wires are run from several components and combined into one substantial (and so more reliable) earthing point. Don't forget that the engine needs a separate earth strap.

LOOM COVER MATERIAL

Various options exist for loom covering, but they don't include bog standard adhesive electrical tape, which tends to harden, unravel and leave a horrible sticky mess on the wire. PVC sheathing looks neat, but can be slightly fiddly to use, as the wire bundles usually have to be threaded through it using a suitably stiff wire guide. Slit sheathing is much easier to fit, and makes subsequent access to the wires more straightforward.

CRIMPING

Your loom will require a hundred or so connectors, and crimping is a perfectly acceptable method of attaching them. Crimps are naturally vibration resistant, but supplementing them with solder tends to reduce this characteristic, so it's probably best not to bother. Good quality crimping equipment with ratchet systems to control the amount of force applied to the joint make the process a lot more straightforward. Insulated crimp connectors are very easy to use. Non-insulated crimp connectors take a bit of practice to achieve consistently, but it's worth the effort.

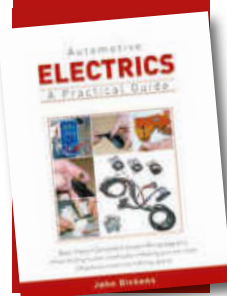
Bullet crimps are also easy to use, and are a handy way of creating multiple feeds from one supply, such as sending an indicator signal to both front and rear lights and the dashboard 'tell-tale'. It's important to match the bore of the bullet to the size of wire, or the crimp connection will be loose. A special bullet-closing tool might sound like an extravagance, but they only cost around a tenner and certainly save your fingers.

Standard crimp connectors won't last long if they are regularly exposed to road spray. Waterproof multi-connectors (which may require a purpose made crimp tool) are more suitable choices for connectors inside wheel arches or engine bays.

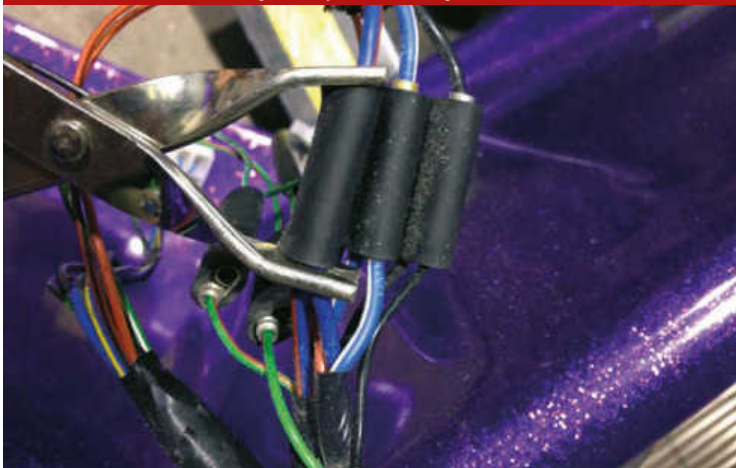
I'd hate you to think that I've wasted your time for the last 3000-odd words, but if a ready-made plug-and-play loom is available for your car, it's hard to argue against using it. However, the sense of achievement from overcoming the most daunting of kit car challenges is considerable. Being able to say, "I built this" is impressive, but "I wired it from scratch" sounds even better!

CKC would like to thank Car Builder Solutions (www.carbuildersolutions.com) for some of the images used and also assistance with information. ■

Further reading:
John Dickens' Automotive Electrics book is available at www.completekitcar.co.uk



Below: A bullet connector closing tool may seem an indulgence, but makes life much easier.



Below: In exposed locations you can buy waterproof multi-plug connectors such as these.





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New Products

Pipes and hoses

Now's the perfect time to check your kit car's brake pipes and fuel lines to make sure they are in good condition for the year ahead. And if you need to replace or upgrade anything, then Goodridge almost certainly has a product for the job. And for kit car enthusiasts, that invariably means a visit to the BGC Motorsport website...

Prices: See website
W: www.bgcmotorsport.co.uk



Porker pistons

Following hot on the heels of CKC's recent feature on using Porsche engines in kit cars, Cambridge Motorsport Parts now supplies replacement JE pistons for the 996 engine. Available for either Nikasil or sleeved bores, the pistons can be fine-tuned to your specific requirements.

Price: From £1320 inclusive of VAT.
W: www.cambridgemotorsport.com



By-pass thermostat

Here's a remote thermostat and housing from Car Builder Solutions. Vitally, it allows water to flow around the engine while it's warming up, before opening the 87deg thermostat to let water flow through the cooling system.

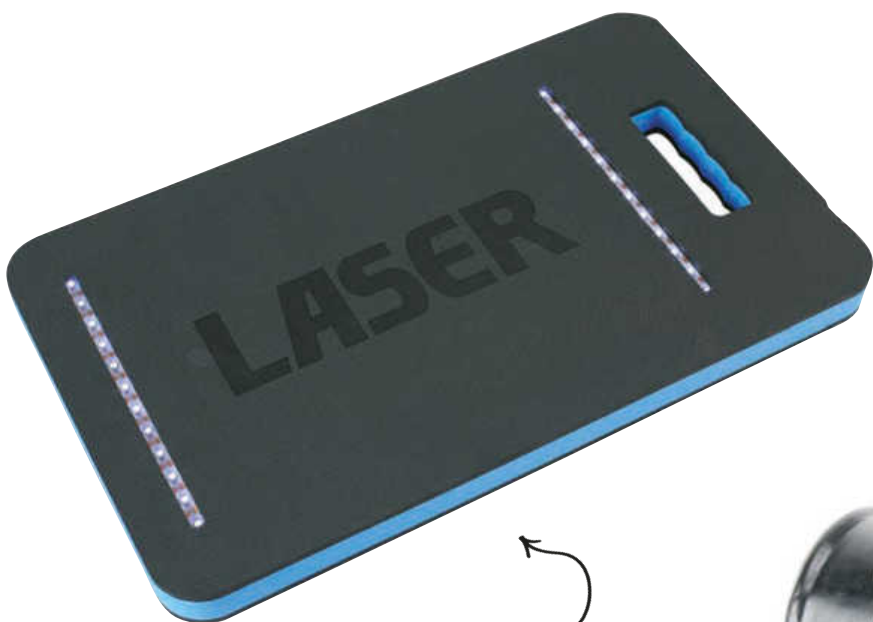
Price: £32.40 inclusive of VAT.
W: www.carbuildersolutions.com



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W: www.lasertools.com





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Running Reports

The latest updates from our team of Running Reporters, building their cars at home. Are you inspired to get into the garage?



Rob Davenhall

PROJECT
Midtec Spyder

AGE
37

OCCUPATION
Specification manager

PROJECT START
April 2014

Christmas has come and gone and work on the Midtec has been very slow indeed. In fact, I haven't touched it for nearly six weeks; it's amazing how quickly the dust settles. Instead, I've been installing a new drive and front entrance to my house. This was planned and timed to fit in with the departure of the engine, which went for an overhaul after the mishap with the flywheel bolts.

With the engine returned, I have now been able to fit the new cambelt, water pump, blanking plate, oil pipe, splash plate and low line sump from Tiger Racing, who have been very helpful and professional. The engine, as I write this, is still on the engine stand but is now ready to be plumbed back in the car. Before I do this, though, I want to take the opportunity to make a few adjustments to the gearbox and also the clutch mounting bracket, so they operate a little bit better. Things were a bit tight during the first installation. The plan is to get the engine back in the car by the end of January so I can get back to the wiring and dashboard.

So things have started moving again and 2016 has started promisingly and the chance of a track day or two are very positive. To be honest, I have booked a few already (don't tell the wife), but I have decided that I'm not going to rush this time, as that's when mishaps happen, so if I make it I make it, if not I'll take the Saxo.

Over the last few months, I have been contacted by a few other Midtec owners about the engine install, mainly as they too look to replace their ageing Pinto or Renault Fuego engines and use a more modern Zetec engine. So here we go with my own findings from going through this install.

The engine is quite a bit wider than the Pinto, so the first battle is to get it in. New engine mounts and also some chassis alterations were needed. I got the engine mounts from Retro Ford who are very helpful. I would recommend anyone who is trying something out of the ordinary using Ford parts to give them a call. I opted for the DIY engine mounting kit, basically they supplied all the pieces but it still needed cutting to size and welding. This made the job a whole lot easier.

The engine could only be mounted in position with the gearbox already

in place, so this had to be done at the same time. I chose to use the Renault NG3 box as originally designed. This again was handy as the Midtec's original gearbox to engine mounting plate fitted both the Pinto and the Zetec so I didn't need to do any modifications to this. The main changes in this area were to the flywheel and clutch. I had to use a Zetec 1.8 flywheel with a Renault Fuego turbo clutch. This was to make sure the shaft out the gearbox could be used without modifications. There was much trial and error selecting the right clutch, but luckily I had a friendly garage that could get a few different ones in to try before we got the right one.

Mounting the engine and gearbox was actually a relatively straightforward part of the process. I think this was helped due to doing homework and talking with other Midtec owners and Zetec rear-wheel drive conversion experts.

The next bit was to take the engine back out and convert it ready for kit

car use. This included a new low line sump and associated gaskets and new oil pick-up pipe. Then came a new cambelt and water pump, followed by new plugs and leads with a full engine flush and new oil and filter. Finally, it was ready to go back in. I would like to point out this is what I would class as minimal work to be carried out and a full strip down and rebuild would always be better but I'm on a budget.

The other extra was a blanking plate for the oil breather, it may only be a small piece but it's another £25 and they all start to add up. I did manage to sell the aircon pump and starter motor which helped!

Once the engine was done and remounted, the next step was the exhaust. Easier said than done? I used the original manifold and then bent and welded the remaining sections to suit the complex and very tight run. In all, this I think was the most time-consuming and complex job, taking about two days to get right,



Above: Sump is one of many considerations when converting engine. Below: Tiger Racing supplied many parts.

Next issue

JOHN CLEMENTS
Tiger Supercat

ANDY GREEN
Healy Enigma

IAN JACKSON
GKD Legend

ROSS MAYNARD
Tiger Super Six

ED MORTON
Nova

JON PAGE
GBS Zero

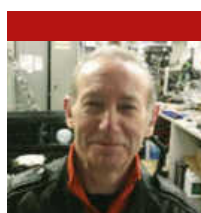
but also one I was most proud of. The exhaust fabrication also required the need to heat wrap the manifold (very itchy, use gloves and an old coat or jumper) due to the close nature of the body work. It also required the locating and mounting of the original lambda sensors. The issues that came with the car no longer having a catalytic converter, yet still intending to use the original ECU, meant I had to cheat the sensors by protruding the furthest one from the manifold to fool the ECU it still had one and stop the engine going into limp home mode.

The other alterations required to complete the installation were relocating the starter motor, alternator

and water rail. There is a lot more work than I first expected, but I suppose that is part of the challenge of building a kit car. I enjoy solving problems. One thing I would say is that you can run away with costs if you're not careful. I could have spent a lot more than I have, but I was reminded quite regularly by the wife I was exceeding my budget. To help others looking at this process, I have listed my engine spend so far. I have probably forgotten something, but this will give you a good guide as to what I would consider essential basic engine upgrades...

- Engine block £325
- Engine mounts £100

- Flywheel - £85
- Clutch £65
- Sump £250
- Gasket £20
- Oil pickup pipe £25
- Water pump £35
- Cambelt kit £80
- Blanking plate £25
- Plugs £30
- Leads £100
- Oil £50
- Oil filter £15
- Exhaust heat wrap £35
- Lambda sensors £50
- Lambda sensor mounts £20
- Pipework £100
- Water rail/manifold £220
- Total £1630



Trevor Crout

PROJECT
Tornado TSC GT40

AGE
69

OCCUPATION
Retired

PROJECT START
September 2015

I have spent most of my working and social life making models. My apprenticeship was in engineering, quite a lot of my time was in the fitting department at Johnson and Phillips Electrical Engineers. This mostly involved using hand tools to make fabricated parts fit by file and trial! This was in the days before robots and CNC machining.

The parts tended to be flame cut using a pantograph type machine guided by hand, and therefore not high precision. It was good training for working on classic cars. Since then I have worked as a professional model maker and as a CNC programmer and machinist.

I have always had an interest in cars, at first this was because I could not afford to take my second-hand vehicles to a garage. When I retired, I joined my local MG club and restored a teal blue MGB GT and then a MGB GT V8. I enjoyed this and, three years ago, I went to both the Le Mans Classic and 24-Hour. I am now a regular visitor. A year ago I decided to build a Tornado GT40 Mk2 replica.

It is only recently that Tornado Cars has offered the Mk2, and it is still a relative rarity as most people prefer the Mk1 with the glorious Gulf colours. For me, I only ever wanted a replica of the Chris Amon and Bruce McLaren black and silver car. This year is the anniversary of the Ford 1-2-3 and, of course, the winning car was black and silver number two. I will be driving it to Le Mans this year.

I picked up enough parts in September last year to build the

rolling chassis, and with the help of my friend Jonathan Rowe it is now ready for the body to be fitted. Jonathan has allowed me to use his workshop and provided transportation to collect the rest of the Pro Kit in early January. Tornado can now supply a Holley style injection system by FAST USA, which means the engine layout should look more like the original. I look forward to getting my hands on the body sections as it will then start to look like a real car.

My plan is to make the car as close as possible externally to the real thing. Although the body mouldings include a proper rear section, including periscope ducts and spoilers, the nose section does not have the raised Daytona front wheel arches. I will use my model making experience to fabricate the wheel arch extensions. I have a digitising arm and 3D software which I will use to draw and machine female tools to form the wheel arch humps. I intend to let these in to the bodywork rather than



Above: Having collected his Tornado kit in September, Trevor is planning to drive it to Le Mans in July!

to build them up as solid lumps of glass and resin. In the next instalment you will know if I have over confided!

Having to earn a living as a model maker has made it necessary for me to keep up with technology and to find ways to reproduce parts to look as real as possible, to find solutions to problems. I am treating this project as a full size body model and, so far, it has been very enjoyable.

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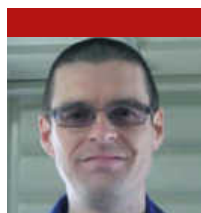
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Chris Haysom

PROJECT
RoadRunner SR2

AGE
47

OCCUPATION
Vineyard worker

PROJECT START
January 2014

Is it ever going to stop raining? I appreciate that my water problems are insignificant to those who have been flooded, but annoying nonetheless. What started out in the garage as a couple of minor drips has now turned into an ever-increasing row of buckets and containers on the floor to catch the rain. The roof is made of sections all held together with plastic rivets and every time I go into the garage and look up there are more drips. What I need is a dry spell of weather to either try and repair the roof or replace it. This has all meant the chassis is now covered in a large plastic sheet and anything I am working on is covered before I leave – not conducive to a pleasant workplace!

I spent some quality time in the garage over the Christmas period, in between emptying buckets, and the engine has come together nicely and, apart from fitting some new gaskets and a paint finish on the rocker cover (which will wait for the warmer and drier weather), is all ready to be joined with the gearbox, remembering of course to fit a clutch first – now which one of the esteemed CKC writers forgot to do this?

The modified shallow sump has also been treated to a paint finish using the same black engine enamel as the block which I hope will hold up well once it's baked on with some heat from the oil. I was going to paint the sump silver, the idea being that this would show up any oil leaks, but I decided I have



Above: Buckets are there to collect the drips...

confidence in my assembly skills and went with black!

I have also fitted the hardened inserts into the enlarged holes to accept some stainless set screws for the lower timing belt cover that you may remember I had the trouble with last time. This will all keep it correctly positioned to set up the timing marks. The damaged cover mounts have been repaired with some M10 stainless washers bonded on with some high temperature sealant.

Another job that I have been putting off for ages is getting rid of the remains of the MX-5 bodywork, which I cut up at the start of the project. For 18 months, it has all been sitting down behind the garage out of sight and secretly I was



Above: ...and the chassis has to be covered.

hoping that a new species of tin worm would devour it all overnight – no such luck! Now it all had to be moved so we could build a new shed to house all the junk that currently sits in the rotten lean-to on the back of the house which will have to come down this year before it falls down; we're not sure what's holding all the windows in! So now all the scrap is on view and has to go, but it will need to be cut up smaller to make it easier to handle.

So it's a bit awkward working in a leaky garage with everything covered up, but I am hoping to get the engine and gearbox joined up and the assembly fitted into the car which will free up loads of space for more buckets!

Below: Engine looking good.



Below: There'll be no oil to see on black sump, right?



Below: Chopped up Mazda needs to go...



Tom Hyland

PROJECT
Raw Striker

AGE
42

OCCUPATION
Software development manager

PROJECT START
January 2012

Last time around I was having some serious doubts about my ability to complete the build, in particular the complications arising from using a bike engine. I ended up calling Martin at Raw for his advice, and got his take on the whole situation. I was reassured, a little, and so decided to recommit to the build. I organised with Martin to get the suspension set up, so that I could move forward with the bodywork. In the end, I asked for Raw to fit the bodywork as well, because this was one of the jobs I was not looking forward to anyway.

I hurriedly fitted a second-hand steering wheel so that the car could be moved around more easily, and on a (very!) windy and rainy Saturday the car was towed to Hereford, with all the bodywork, and left with Raw for Christmas. In the meantime, I ordered an electric reverse, and a pair of steering column mounted gearshift paddles, from AB Performance ready to fit to the car upon its return.

As the car has been away for the past month, there is not much more to report. I called Raw yesterday to organise collection, and I am

looking forward to next weekend because the build will look much more like a car with all the bodywork on – apparently it is very green, and the guys at Raw have nicknamed it Kermit!

The next job after getting the car back is getting the engine running. I have a cunning plan to temporarily use a set of standard R1 exhaust headers mounted upside down on the engine, so hopefully I will be able to get the engine running before splashing out a significant sum of money for a custom manifold – well that's the plan anyway.



Jason Burrage

PROJECT

DeHavilland DVT GTS V6

AGE

44

OCCUPATION

Project manager

PROJECT START

November 2014



Above: Jenvey throttle bodies in place, but in need of an air filter.



Above: Omex 710 ECU will live in the boot.

At the end of the last report, I mentioned the Tesla Model S P85D we were about to collect. After two months of driving it, I have to say it's proving even better than we expected. It has a unique experience all of its own, and a stunning one at that, much like the kit cars we build and enjoy. This brings me onto the car I'm building and hope to enjoy one day...

I'm now at one of the most exciting stages of a build, getting the engine running. I managed to do so, although there were a few hurdles along the way!

First job was to get the Jenvey throttle bodies fitted and fuel rails plumbed in. There were two challenges here as they don't come with any sort of idle stop or adjustment, so I had to fabricate this myself. I also wasn't happy with the supplied cable connection between each bank of throttle bodies. This may be fine for racing, where light throttle and idle aren't important, but I could see the cable didn't allow the second bank to return to the same position each time. This would lead to an unsteady idle so I bought an M4 turnbuckle with rose joints, normally intended for radio controlled cars, and made up a solid link. This works very well indeed and makes balancing them a breeze.

The Omex 710 ECU arrived and their tech guys were great in helping determine how best to set it up to cater for semi-sequential injection, wasted spark and even the purge valve on the emissions canister. They supplied a pre-configured map to help me get it running, while providing email and phone support when required. I decided the ECU should be mounted in the boot for convenience and to protect it from the elements.

The first thing I did was strip the old Rover KV6 engine loom into each

separate connection and associated wires, identifying which connector and wire colours went to each connection on the engine.

I then created a spreadsheet with three columns, one for each of the wiring looms – MG TF loom, engine loom, ECU loom. This spreadsheet listed each wire colour code and a description of what it did. This made it easy to map each wire to where it should go, and gave me a complete picture of how to connect each loom. It also allowed me to group the wires conveniently and determine what connectors I needed.

When the connectors arrived, I started with the easy part and made the connections from ECU to MG TF wiring loom. With that wiring in place and secured in the car, I then set about building the engine loom. This is a very easy task if done methodically, and I chose to work backwards from each connection on the engine. Wires were taped together and covered in a mesh wiring loom sleeve to protect them, and routed neatly along each injector rail on the engine, merging into a single bundle at the rear of the engine. Each wire was then cut or extended to reach the connector to either the MG TF loom or the ECU loom. Earth and power wires were spliced together for convenience.

With all the connections completed, I connected the wires to the fuel pump, put some petrol in the tanks and checked the fuel pressure at the injectors. All seemed fine, until I tried to start her. The engine turned, but wouldn't fire. I noticed the ECU was showing no engine speed on my laptop, so I checked for power to the crank sensor. After a few moments of thinking, I realised the power to all sensors, injectors, coils and fuel pump

was via a relay switched by the ECU. The ECU switches this on for a few seconds to prime the fuel pressure, then waits until it detects the engine being cranked. Without power to the crank sensor, it never sensed the cranking. With a few unused terminals in my loom connectors, it was a quick job to swap the crank sensor power to an ignition-switched source.

I immediately saw rpm showing on the laptop, but still no life in the engine, so it was time to check for fuel and spark. A quick check with my timing strobe confirmed I had spark, but I couldn't smell or see any petrol vapour in the throttle bodies. I applied power manually to an injector and nothing came out. They were the injectors from the MG ZS 180 engine I'd sourced, so concluded they'd probably seized up inside from sitting unused for too long. Instead of messing around, I ordered a set of Bosch injectors that were correctly sized for the estimated engine power. With these installed, I at least had fuel squirting in, so got some pops and bangs.

The ECU determines ignition timing from the crank sensor and trigger wheel. The trigger wheel has a few teeth missing so the ECU can determine where top dead centre is, but exactly

Below: Waterproof connectors in engine bay.



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Above: Plenum box will connect to remote filter and cold air feed.



Above: Extensive kit of parts from Venhill for the throttle and clutch cables.

where these occur compared to TDC varies for different engines. Omex don't have any data for the MG ZS 180, but their mapping software caters for this with a neat feature allowing quick adjustment of the timing alignment. A few clicks of the mouse while cranking and the engine sparked into life, albeit a little rough.

With the engine now running, Omex recommended I set the ignition map to 0deg BTDC across all speed and load points. This would allow me to refine the timing alignment by using my strobe light to check the engine timing matched the 0deg instructed by the ECU. With that done, I set the timing to 15deg BTDC across the entire map and the engine now runs rather well. It's only had a few minutes of running so far, but that's enough to detect an internal problem. It sounds like one of the hydraulic cam followers hasn't pumped up properly. I spoke with Piper Cams for a second opinion and they agreed it was most likely a follower. Unfortunately, this means the engine will need to come out so I can get the cams off and check the followers. They advised against running it further as the loose clearance

may damage the camshaft in time.

Before I do that, I want to sort out an air filter of some sort. I've decided to fabricate a plenum from 3mm aluminium sheet using my TIG welder. It's essentially a large box that bolts across the top of all six throttle bodies, with a 70mm pipe at one end. Neoprene ducting hose will then connect this to a K&N Apollo filter mounted remotely to feed cold air into the engine. This is still work in progress, but should be finished in the next week or two.

I also want proper control of the revs when I next start the engine, as I need to hold the engine at 2500rpm for 20 minutes to bed in the followers and work-harden the cam lobes. I had tried to fit the old MG TF throttle cable, as that's what DeHavilland use, but it isn't long enough to reach with the KV6 installed. After a few hours looking for bits on the internet, I decided to save myself some time and just get a Workshop Clutch/Throttle Cable Kit from Venhill. It's a rather comprehensive kit, so isn't cheap, but it has Teflon lined outer sleeves and comes with a good array of ferrules and nipples, as well as cutters. Given that I need to make up three or four

control cables for each door lock, it'll be very handy and probably won't be any more expensive than buying all the bits individually.

Anyway, starting the engine highlighted a few other niggles ...

- The alternator wasn't charging and didn't even ignite the ignition warning lamp on the dash. A new regulator has resolved this, but the ignition light now comes on sometimes, even though I'm seeing over 14 volts which proves it's charging.
- I was going to calibrate the ECU for the standard KV6 temp sender, but discovered the resistance range is a bit too low for the ECU to handle accurately. I've therefore fitted an Omex sender.
- The oil-to-water cooler had a small oil leak. I stripped this to clean it a while back and one of the gaskets (which is unobtainable) was a little damaged. I used sealant when reassembling, but clearly this hasn't worked. I've therefore cut a new gasket, which is so far doing the job.

That's it for now. Hopefully by the next report I'll have the engine noise resolved and everything running fine.



Vivienne Lodge

PROJECT
Westfield SE

AGE
56

OCCUPATION
Retired driving instructor

PROJECT START
March 2015

When it comes to the steering, I have selected the wide track option for my car and therefore it is first necessary to shorten the steering rod. So, very exciting as I get to use my new angle grinder which I have bought especially for this purpose. Only a cheap one as I will probably never use it again. Armed and ready complete with my gardening gloves, a proper mask and long sleeves, I put the rod into a vice. Off we go, sparks flying. Great fun

and resulting in a centimetre off each end. Easily entertained! This was then fastened into place on the front of the chassis using plastic mounting clips and steel hoops. I also attached the battery earth at the same time and covered it with grease.

No amount of routing through various boxes resulted in finding the extender bolts that I needed to screw onto the ends of the track rods. Westfield popped a couple in the post



Above: Steering arms being shortened.

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Above: Steering rack mounted.

and I attached them complete with the protective rubber sleeves.

The steering column needs to be passed through the bulkhead and so a rather large hole has to be made at this point. I drilled the hole, filed it smooth and fitted a large rubber grommet.

I must admit I was left guessing a bit by the instructions in the manual regarding the different sections of the steering column and the fitting of the universal joints. This wasn't helped by a section of the column not being present. A real head-scratcher and a few photos required from my friend at Westfield to show how it all fitted together. I attached the universal joints and as I waited for the missing piece of column I did as much as I could. However, the column support bracket still can't be fitted until after the engine is in place, as I can only drill into the frame when I know the exact position of the engine.

When it came to front suspension,



Above: One front corner assembled.

uprights and brakes the first thing was to identify the right and left uprights. I found handling the front uprights much more tricky than the rear ones as they kept spinning whilst I was trying to get hold of them. Consequently, I managed to drop one, but apart from an extremely bruised foot there was no damage to the disc!

Having attached them onto the relevant ball joints, being careful to use the correct safety washers, I found that the joints kept turning, preventing me from tightening them. I found out that I needed to apply direct pressure onto the actual joint which held it still whilst



Above: Speedo sensor fed through the bulkhead.

I managed to tighten and reach the required torque. Then I fitted the track rod arm onto the steering arm.

At this point, it advised fitting the speed sensor and so I attached the sensor bracket to the upright and used a feeler gauge to achieve the 2mm gap required. The cable was then sheathed and threaded up and along the chassis where I had drilled a hole for it to pass through the driver's bulkhead. I used cable ties to secure it to the chassis frame and fitted a grommet for the hole.

The suspension struts were prepared much the same as the ones for the rear of the car. I did have trouble at first winding the collar up to the required setting of 115mm, to the point of putting a lovely bend in my C-spanner! So I unwound them completely and applied some grease and started again. This appeared to do the trick.

The rear panel and light assembly awaits me now and so off I trot!



Stuart Bruce-Jones

PROJECT
AGM WLR

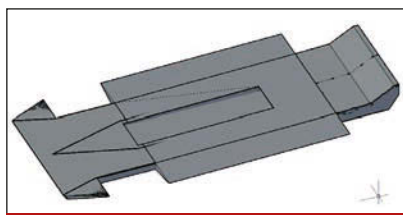
AGE
30

OCCUPATION
Aerospace project manager

PROJECT START
August 2010

It's been a mixed bag this month! The engine has been tweaked (video on YouTube) and so I thought it would be prudent to have a little test. The hydraulic concentric clutch thought otherwise as the pedal hit the floor and the concentric seal decided to pull itself apart. Hands up, this was my mistake but with a call in to Reyland Motorsport, who have been able to assist me with some custom work, we look to be back in good shape. Also, the ABS modifications are now complete and the car can be set up with traction control.

Did somebody say aerodynamics? The car seems to have taken on a second role as a science experiment. The aerodynamics have been a bug bare of mine for many years. The car has amazing potential for utilising aerodynamics to its advantage, so I will.



Above: How the belly pan will look.

A complete belly pan has been designed that not only introduces a wing ground effect function, but allows the exhaust gasses to be routed through the rear diffuser, accelerating the airflow and increasing downforce, while simultaneously directing airflow hitting the car to the filters and radiators and not into the engine bay which all helps reduce drag! Let's not forget

it also doubles as a sump guard for the engine, which is fairly low. You've got to love the look of that mock up rear diffuser though – very Le Mans. Obviously not in plywood though. Wasn't that on an episode of *Top Gear*?

Well that's the plan. The frame has been completed and I'm now awaiting delivery of the laser cut panels. Exciting times ahead! ■

Below: Rear diffuser mocked up. Final job won't be made in ply – this is CKC, not *Top Gear*!

Between The Lines

A home for everything that didn't make it into the main part of the mag.

Do the hustle



While cycling in his native Norfolk, CKC contributor Martin Scott came across a rare sight – a Hustler six-wheeler. While it has all the hallmarks of a car that's long been dormant, most notably a rather mildevy tone, it was apparently running until recently. The graphics reveal that it had

been used as a promotional vehicle for an MoT garage, so Martin made further enquiries.

Apparently it has the running gear from an MG Metro Turbo, so it's livelier than its straight-edged appearance may suggest. Will someone rescue it? It would be a shame to let it rot away.



Tiger, Tiger...

On the topic of unused kit cars, the editor's old Tiger race car came blinking into the daylight for the first time in a while this month. It has now

been idle for more years than it raced, but sentimentality means it's still around. Will it ever see action again? It's a heartening thought...



Speedster snaps

It seemed criminal to run just one photo of Michael Oliver's Speedster replica in the feature on his Spyder, so here are a few more. His 718 RSK replica is just as special, and we'll have plenty of photos of that in the next issue. ■



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